THE BUCHEUM I

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BY SIR ROBERT MOND, LL.D., F.R.S.E.
AND OLIVER H. MYERS

WITH CHAPTERS BY
T. J. C. BALY, D. B. HARDEN, J. W. JACKSON, D.Sc.
G. MATTHA, AND ALAN W. SHORTER

AND THE

HIEROGLYPHIC INSCRIPTIONS
EDITED BY H. W. FAIRMAN

FORTY-FIRST MEMOIR OF
THE EGYPT EXPLORATION SOCIETY

VOLUME I
THE HISTORY AND ARCHÆOLOGY OF THE SITE

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CONTENTS

VOLUME I

PREFACE

In addition to those named on the title page, a large number of people have contributed to the making of this book. As far as possible signatures are appended to contributions, and a list of the authors of these sections is given below, together with the names of those responsible for the bulk of the plans and drawings. There is a further list of those who have been kind enough to read sections of the text, and also of those who have contributed in other ways. Nevertheless, the authors wish to point out how much of this memoir is due to those whose names do not occur in the text.

First among these are the members of the excavating staff who, for one reason or another, have not taken part in the actual writing of the book, but whose share in the work has been of paramount importance.

Neither is it possible to do justice to the varied native staff, Quftin, Baladi and Barabri, from Mohammed *et Tabbākh*, upon whose labours so much depends (for Napoleon's dictum on the progress of an army surely applies to excavations), to *esh Sheikha ed Dawa*, whose ministrations to our local patients, though not entirely angelic despite her ten summers, were certainly efficacious.

These workers, men and children, happy and quarrelsome, grasping and generous to a fault within the hour, are something more than the machinery of science. El Fellah, " the man who is half a boy and the boy who is half a man," oppressed and leaderless though he has been for centuries, is still the heir of the civilisation we study, and those who would paint a true picture of Egyptian life with the dulled pigments of archæology, cannot do better than add to their palette from the living colours about them. If they cannot do so, they must paint a very sober canvas.

CONTRIBUTORS

T. J. C. Baly	*The Stone Enclosure.*
	The Religious Significance of the Funerary Objects.
Prof. C. O. Bannister	Metallurgical analyses.
W. F. Brazener	,, ,,
A. G. Buchanan	Plans.
H. E. Cox	Analyses.
W. Crum	Coptic Ostraka.
C. A. Earnshaw	Metrology.
W. B. Emery	Plans and reconstructions.
H. W. Fairman	*The Hieroglyphic Inscriptions*
	The Baqaria Roman Village.
A. S. Fulton	An Arabic Inscription.
F. W. Green	Plans.
Prof. F. Ll. Griffith	Demotic inscriptions.
A. F. Hallimond	Mineralogical report.
D. B. Harden	*The Glass.*
Prof. A. S. Hunt	Greek Ostraka.
Dr. J. W. Jackson	*The Osteology.*
Prof. D. P. Laurie	Analyses of paint, etc.
R. N. Lester	Drawings.
A. Lucas	Commentary on analyses.
G. Mattha	*The Demotic Ostraka.*
T. Midgley	Report on textiles.
Miss D. Reynolds	Petrological report.
R. Rigby	Metallurgical analyses.
Miss K. Schlesinger	Report on the flute.
Miss N. E. Scott	Drawings.
W. B. K. Shaw	Plans and drawings.
A. W. Shorter	*The Amulets.*
T. C. Skeat	Greek Ostraka.
Sir Herbert Thompson	Demotic inscriptions.
Prof. R. S. Troup	Report on wood.

We wish to thank the Directors of Imperial Chemical Industries for permitting Mr. Brazener to undertake the analyses upon which he has reported.

We owe a great debt to the Air Ministry, to Squadron-Leader G. Tyrrell, and to

Wing-Commander R. T. Leather, for the aerial mosaic and oblique photographs of the concession which are published here.

We are further indebted to Mr. G. W. Murray of the Desert Survey of Egypt for the map which appears on Pl. I.

Our thanks are due to the following for their kindness in supplying photographs for publication of objects in their charge :

Mr. J. Allan	Nome coins of Armant	British Museum.
Messrs. Arnold & Sons, Ltd.	Recent veterinary enemas	
Monsieur C. Boreux	Head of Apis	The Louvre.
Prof. Christian	Two ox mummies	Vienna Natural History Museum.
Mr. R. Engelbach	Bucheum objects ; Mnevis Canopic jars and statue of Ahmes	National Museum, Cairo.
Prof. P. Montet	Mummy ticket	University Museum, Strasbourg.
Prof. Sir Flinders Petrie	Cow stela	University College of London.
Mrs. C. Ransome	Ox mummy	New York Historical Museum.
Prof. A. Scharff Prof. J. Sieveking	Ox mummy	Münchener ägyptische Sammlung.
Mr. Sidney Smith	The Domitian stela and Bronze figure of Buchis	British Museum.
Prof. Dr. G. Steindorff	Relief of sacred bull in boat	Leipzig University Museum.

We are also grateful for the kindness of the following in giving us every facility and assistance during study in the Museum Departments under their control : Messrs. Allan, Barnett, Glanville, Mattingly and Smith, of the British Museum ; Messrs. Boreux and Drioton, of the Louvre ; Messrs. Demel and Junker, of the Kunsthistorisches Museum, Vienna, and Messrs. Brunton and Engelbach, of the National Museum, Cairo.

The following have been kind enough to read different sections of the manuscript and to examine some of the plates, and we owe them thanks for the many helpful corrections and suggestions which they have made—

Mr. Horace C. Beck	Prof. F. Ll. Griffith	Prof. Margaret Murray
Dr. H. Idris Bell	Mr. G. L. Harding	Geh. Prof. W. Otto
Mr. A. M. Blackman	Prof. H. Junker	Mr. J. W. E. Pearce
Mr. Guy Brunton	Mr. Hugh Keen	Prof. T. E. Peet
Mr. R. O. Faulkner	Mr. Hugh Last	Mr. T. C. Skeat
Mr. S. R. K. Glanville	Sir Henry Lyons	Dr. W. W. Tarn

We are also indebted to a number of others for verifying for us the identification of certain objects and for offering helpful suggestions. Dr. Ludwig Borchardt and Mr. C. C. Edgar and Dr. J. G. Milne made helpful suggestions with regard to the interpretation of the stelæ. Prof. Baly, of Liverpool University, and Messrs. Adams, Friend and Steward, of the Central School of Arts and Crafts, London, assisted in the study of the metal objects, while Prof. J. McCunn and Mr. Holmes, of the Royal Veterinary College, gave us valued help.

INTRODUCTION

Whilst completing the excavations in the vicinity of the Tomb of Ramose in the Theban cemetery during the spring of 1926 I was informed by my chief foremen, Moussa Abdel Maluk and Sheikh Omar, of the discovery of a bronze bull and inscribed stonework during some illicit excavations, carried on during the war, in the desert on the edge of the cultivation, about four miles due west of Armant, the ancient Hermonthis.

We knew from many classical authors that one especial bull called Buchis by the Greeks and Ba-her-khat by the Egyptians was in the great temple at Armant. The possibility of finding the burial place of the bulls made a very tempting proposition, as Mariette's great discovery of the Serapeum at Memphis some eighty years earlier had thrown peculiarly little light on the cult and conceptions connected with it.

A hurried visit to the locality showed that there were two sites, a larger and a smaller, which appeared promising. An application for a permit for a preliminary excavation was declined by the authorities ; so the concession had to be applied for in due form. As the concession required a map of the district, and as the cadastral survey extended only to the edge of the cultivation, my assistant, Mr. Walter Emery, spent the next three weeks in carefully surveying the territory with the wadis running miles back into the mountains, and a concession covering about fifty square miles and reaching down to the river was applied for and obtained in the name of the Archæological Institute of the University of Liverpool.

The formal consent we only obtained towards the end of February in the following year, and in the short time left for the season's campaign I decided to commence with the smaller of the two sites.

We quickly obtained results of a somewhat unexpected character. The long trough stretching east and west was due to the collapse of a vaulted passage in burnt brick, having openings at regular intervals on each side and apparently closed by a trilithon gateway which led to an empty[1] chamber at the local-west end. Subsequent excavation proved the existence of what appeared to be a well, but subsequently proved to be a shaft with steps leading to a burial chamber (Baq. 33) almost completely filled by water.

On the north side of this passage two very large independent burials (Baq. 30 and 31) were found, each containing, inside a thick brick-vaulted building, quartzite sarcophagi of similar dimensions to those we knew at the Serapeum of Saqqara.

A considerable amount of ingenuity had to be exercised in displacing the lids of some fifteen tons weight so as to be able to examine the contents, especially as all material required had to be carried some fifteen miles on the backs of camels.

Unfortunately the presence of moisture had destroyed all evidence except some pots, from

[1] See *Liverpool Annals of Archæology*, Vol. XVI. "A Preliminary Report on the Excavations at Armant": Pls. I–XX, pp. 3–12.

whose shape, and from an inscription we obtained on some fragments of another (which it took four separate searches to complete), we ascertained that we were dealing with the burial place of the cows which were the mothers of Buchis. In the main passage a number of offering tables were found with interesting inscriptions which proved to be extremely difficult to translate.

I had a motor road some ten miles long cleared from Medinet Habu to the site and went to visit Mr. Emery two or three times a week to inspect the work and record the progress. As I was unable to go out to Egypt in the following year, I had to judge from the excavation reports how far any advice I was able to give the members of the expedition led to results.

This first excavation promised better results from the future, and acting on the desire of the Liverpool Institute of Archæology, the concession was transferred to the Egypt Exploration Society. An expedition consisting of Dr. and Mrs. Frankfort, Mr. W. B. Emery, Mr. and Mrs. Pendlebury, Mr. S. R. K. Glanville and Mr. Alan W. Shorter, commenced the new campaign in the winter 1928–29.

The excavation of the larger site revealed a sloping passage with a series of gateways made of sculptured blocks which had been taken from buildings in Thebes, and led into a cross-passage, on either side of which the burial chambers of the Buchis bull had been excavated. Many had been robbed and others damaged by the rising water-level. According to M. Legrain's careful determinations at Karnak, the Nile bed rises through the deposit of mud nearly exactly a yard every 1,000 years and, as the level of these tombs had been decided on some 2,500 years ago, the water of infiltration now stands approximately 7ft. 6ins. higher than at that period. We were nevertheless able to discover a number of intact burials and to find in position the memorial stelæ and offering tables of the majority of the thirty-five burials which had taken place. The unsatisfactory nature of the local rock, which is a shelf of solidified hill-wash, dating probably from the end (Riss-Würm) of the glacial period, made the excavations dangerous and difficult. Difficulties had been already experienced in ancient times, and strong walls of burnt brick had been erected to support the superstructures. We were compelled to convert the whole excavation into an open cut, and it says much for the vigilance of our staff that we had no accidents to report. The Antiquity Service kindly lent us a tramway. These excavations were continued the following year, when, Dr. Frankfort having to leave us rather suddenly—too suddenly for us—we had to organise another expedition, and at very short notice Mr. Green undertook to lead the party. Mr. Emery having been entrusted by the Antiquity Department with the task of examining both banks of the Nile above Aswân, which were in danger of being flooded by the heightening of the Aswân dam (work which culminated in the sensational discovery of the tombs of the Kings of the Blemmyes, a race who we knew had given the Romans much trouble, but otherwise had been a mystery), and Mr. Glanville having had to return to his duties at the British Museum, our party was composed as follows : Mr. and Mrs. Green, Mr. Oliver H. Myers, Mr. H. W. Fairman, Miss Nora E. Scott, and Dr. Baudouin Van de Walle.

Hitherto the party had lived in tents, but I now took steps to provide a permanent camp with electric light and water supply, which, with sufficient working and store rooms, besides adequate living accommodation, much facilitated the work.

The work proceeded steadily; further tombs were discovered and some of the many adjacent cemeteries examined.

The King and Queen of the Belgians honoured the camp with a visit and we were able to

show them nearly the complete set of tombs labelled with the names of the monarchs during whose reign they had been made, roughly from 350 B.C.—A.D. 300.

In the following year Messrs. Oliver Myers, H. W. Fairman, T. J. C. Baly, W. B. K. Shaw, A. G. Buchanan and R. N. Lester extended the work and found on the western side of the trilithon in the cow burials a further series of tombs amounting to thirty-six altogether. With the exercise of much ingenuity and a very great amount of patience two cow mummies were rescued whole. The work of examining surrounding cemeteries which date from predynastic to late Coptic times continued and the Roman village, which abuts on the territory of the cow burials and was possibly occupied by the priests during its early history, was methodically and minutely examined.

The following winter 1931–32 our party consisted of Messrs. O. H. Myers, H. W. Fairman, T. J. C. Baly, W. B. K. Shaw, R. N. Lester, and in addition, by kind permission of the Senate of Manchester University, and with the generous assistance of Sir Henry Wellcome, Dr. J. W. Jackson came specially to study the skeletal material and the geology of the district. This completed the excavation of the two sites.

The very great amount of important material obtained has required a prolonged and accurate study for its elucidation. I decided, therefore, to stop the excavation until our staff had succeeded in collecting and collating the data required. I had already in 1928–29 sent Mr. Emery to study carefully the material and M. Mariette's notes of the Serapeum at the Louvre—a work much facilitated by the kindness of M. Boreux, the chief Conservator of Egyptian antiquities, and M. l'Abbé Drioton. He also paid a visit to Brussels, where M. Capart, the director of the Fondation Reine Elizabeth and the Musée Cinquantenaire, had traced many of Mariette's finds, and where Prof. Marcel Hombert was of much assistance. Mr. Glanville, on returning to the British Museum, found one of our missing stelæ already on its walls, and on a subsequent visit I found another, both of which had been presented some fifty years ago. A search for already existent knowledge hence became imperative.

On the whole, little was known about the sacred bull worship in Egypt, except chiefly uncomplimentary references by classical and early Christian authors, and we have, I hope, succeeded in bringing together a body of evidence which throws some light on the subject.

A great deal yet remains to be done. The burial place of the early bull has yet to be found. The excavations of the French Archæological Mission at Madamūd and at Ṭôd promise to throw valuable light on the subject, and the excavation of the temples of Armant, unfortunately almost wholly destroyed, holds out promise for the future.

We have not hesitated to call on many friends for their assistance, a call with which at great inconvenience to themselves they have most gracefully complied, and I desire to express my own warm personal thanks for their very great kindness. I am well aware of the sacrifice required to tear oneself away from one's own work to comply with a request for the speedy solution of the problems of someone else, and I can assure all our co-workers of the greatest appreciation of their efforts, an appreciation that will be shared by all those who have occasion to study these volumes. Their individual contributions are referred to in another place. A perusal of the work will, I think, justify my action in entrusting this important work successively in the hands of two comparatively young men : Mr. Walter Emery and Mr. Oliver Myers. They have had to gain experience as the work proceeded, as we all must, and they have grown with their

work, as their experience ripened. I have been happy to watch their evolution; it augurs well for their future.

The long series of stelæ we discovered enabled Mr. Fairman to extend our knowledge of the very latest form of hieroglyphic inscription of which we have evidence, and his ingenuity in collating the texts has enabled him to read what would be otherwise undecipherable texts.

The town known as Armant or Hermonthis or *'Iwny*, *'Iwnw-šmᶜ* or *'Iwnw Mntw* throughout the ages was recognised to be the Southern counterpart of the city of On, known later as Heliopolis and now as Mattarieh, where was situated the great temple dedicated to Rē', the sun god, and where the bull Mnevis was worshipped. In spite of the excavations (which were hampered by the presence of water) carried out on that site by Sir Flinders Petrie and later by M. Daressy, we know very little about this bull and his worship, and we are, I hope, entitled to assume that our own conclusions will throw some light on him. More is known about the Apis worship at the Serapeum at Saqqara ; and we have carefully studied Mariette's published and manuscript notes, and such of the material he collected which we could identify.

Considering the early days when Mariette made his excavations, and the pressure put on him by his imperious and impatient master, Ismail Pasha, it is not surprising that he was neither able to finish the excavation nor to work out the results ; but rather we stand in admiration of the immense amount of work he did accomplish. The final examination and publication of the Serapeum still awaits completion.

The very definite dates which limit the existence of our two monuments of Armant make the search for the earlier burials an interesting problem, and the large amount of information disclosed by these excavations, revealing the gaps which have still to be filled, holds out the promise for much more fruitful work in the future.

ROBERT MOND.

CHAPTER I

HISTORICAL SUMMARY

IN the subsequent pages are set forth the facts ascertained from the excavations at the Bucheum and the Baqaria. Certain hypotheses are formulated about the various objects found, but in many cases it is clear that more than one interpretation of the facts is possible, sometimes widely differing yet equally tenable. It is not proposed here to restate the arguments, nor to reiterate the reservations with which conclusions are stated in the body of the work. The purpose of this chapter is to place before the reader the authors' interpretation of all the evidence presented in the other chapters, to relate the history of the site with what is known of other similar sites and to connect it with the history of the period. The conclusions here noted are of value by reason of the prolonged study that has been made of the site, but it must be understood that other interpretations are possible, and for the facts and arguments the reader must turn to the more specialized chapters.

Bull worship is a very common phenomenon throughout the history of the human race.[1] The reasons for its existence are clear, and there is no need to postulate any cultural relationship between two peoples holding this religion in common. The bull stands for fertility in a dual capacity—he is the emblem of beneficent strength to the primitive mind, and therefore an object for emulation, and he is also one of the prime sources of fertility in agriculture, both as lord of the cattle which produce meat, milk, butter and hide, and as tiller of the soil. As such he becomes a symbol of chieftainship and of kingship. Chiefs in the Lake Chad district are buried wrapped in a bull's hide.

The earliest example of religious attention to oxen in Egypt occurred in the early predynastic level of a settlement at Hemmamieh, excavated by Miss Caton-Thompson, where piles of bones of these animals were found arranged symmetrically with the skull on top. In the same neighbourhood Mr. Brunton found the burial of an animal, probably an ox, wrapped in Badarian matting. The representation of the king as a bull on the great slate palette of King Narmer of the First Dynasty is well known. Apis is mentioned on the Palermo stone and must have been worshipped in the earliest dynasties. Throughout Egyptian history Apis is a prominent figure among the gods. Dealing with the inscriptions, Mr. Fairman points out the solar connections of bull worship; and Mr. Wainwright, in *J.E.A.*, Vol. XIX, 42ff, infers a connection with storm gods. Buchis certainly became connected with Mentu, the war god, but this was a later development. To comment adequately upon the significance and particular forms of bull worship in Egypt would require years of research and a special monograph. The present volume is primarily concerned with the physical bull in which Buchis was incarnate, and more especially with his treatment at death.

Two other sources of information are available for comparison with discoveries in the

[1] See A. B. Cook, *Zeus*, Vol. I. Cambridge.

Bucheum—the burials of Mnevis at Heliopolis, and those of Apis at the Serapeum. Of these two the former might be expected to yield closer comparison. Armant was the Upper Egyptian On, or Heliopolis, and Buchis may be more strictly described as the Upper Egyptian counterpart of Mnevis, which was the incarnation of Rē‘ (Wilcken, *Urkunden der Ptolemäerzeit*, I. 1., p. 14) rather than of Apis, though Apis was also connected with the sun. It is difficult to say whether the disk worn by Apis is that of the sun or the moon. The connection of Apis with the moon is probably earlier than with the sun, and the fact that no disk appears on the stelæ until Apis IV[1] of the Nineteenth Dynasty favours the supposition that it is a sun disk. So does the absence of a crescent moon beneath it, such as always appears with Thoth, unless this is represented on the chest as suggested below (p. 3). There is little known about Mnevis, only two of his tombs having been excavated, both of which have been published in a summary manner by M. Daressy in *Annales du Service*, Tome XVIII. Of the objects discovered which are now in the Cairo Museum, it was possible to trace a few only.

P. Tebtunis 313 is a letter to the priests of the temple at Tebtunis from those of the Temple of Rē‘ and Atum-Mnevis at Heliopolis, acknowledging receipt of twenty odd cubits of fine linen, sent for the burial of Mnevis, son of Osortha. The date is A.D. 210–211. None of the tombs of Mnevis or of Apis of this late period has been excavated as far as can be ascertained from published records, but the existence of the former is here proved. The attention paid to the mother of the bull is comparable with that shown to the mother of Buchis at Armant. One of the priests is called Petosorapis, son of Petosorapis. At the Bucheum Petosorbūkhe is a common name for a priest.

The Serapeum provides us with a wider field of study. Even here the information is deplorably scanty in comparison with what might have been expected from such a site. The scarcity of information cannot be laid entirely at the door of Auguste Mariette Pasha, who excavated the site in 1850. Archæological science had not begun ; and, however many regrets there may be at the wastage of valuable material, it is only fair to remember that Mariette was much in advance of his day. He made a complete register of all the objects he found and retained for the Louvre. As far as the knowledge of the time went, he made careful notes of those tombs he considered the more important. Unfortunately, he died before he had done more than begin a study of his material. Since then the objects have suffered many vicissitudes. Those in France have lost their original numbers, and the connections between them and his catalogue are difficult to discover, while the greater number of the objects, other than the stelæ and jewellery, appear to be lost. Subsequent commentary and publication have unfortunately been confined almost entirely to the philological side, and the stelæ are least useful for comparison with the Bucheum material.[2] The majority of them are private votive stelæ in demotic, and the few official stelæ are largely dissimilar from those found in the Bucheum. One or two of these dissimilarities are worthy of note. On the early Apis stelæ the bull wears no disk,[3] and the disk first appears on

[1] Mariette's numbering.

[2] But see Pietschmann's article on Apis (5) in *Pauly Wissova*.

[3] See the plates in *Le Sérapeum de Memphis, découvert et décrit par Aug. Mariette. Ouvrage dedié à S.A.I. Mgr. le Prince Napoléon, et publié sous les auspices de S.E.M. Achille Fould, Ministre d'État*, Paris, 1857. This book must not be confounded with the similar book of the same name by the same author, which is referred to throughout this text simply as *Le Sérapeum de Memphis*, the full title of which is *Le Sérapeum de Memphis, par Auguste Mariette Pasha, publié d'après le manuscrit de l'auteur par G. Maspéro*, Paris, 1882. The latter book has an appendix composed of articles separately published under various other names, notably as *Renseignements sur les Soixante-quatre Apis*.

a small relief of the bull in the top right-hand corner of the stela, and not on the main figure of Apis. This is in Apis IV of the Nineteenth Dynasty. Opposite the relief of Apis with the disk is a cow with no head-dress. Both animals are *couchants*, whereas the main relief shows Apis standing. On the stela of Apis X of the same dynasty the disk first appears on the main portrait. This stela shows great development from those of the early Eighteenth Dynasty. Here there is a bird behind Apis, holding a disk, as there is in a number of Buchis stelæ, but the body of the bird is composed of a sacred eye.

Despite these difficulties, it is worth prefacing a discussion of our own results by a summary of those from the Serapeum. This summary makes no pretence at approaching completeness. The religious problems are only touched upon ; and there has been no time, unfortunately, to study fully all the information available.

The markings of Apis are well known. Herodotus, in Book III, 28, describes them as follows : " He is black, with a square spot of white upon his forehead, and on his back the figure of an eagle ; the hairs in his tail are double, and there is a beetle upon his tongue " (Trans. G. Rawlinson). Sir Wallis Budge, in *The Mummy*, p. 366, describes the figures of Apis as follows : " Usually . . . he is in the form of a bull, having a disk and a uræus between the horns ; on the back above the shoulders is engraved a vulture with outstretched wings, and on the back over the hindquarters is a winged scarab." The figures sometimes show also a saddle cloth, comparable with the bead net of Buchis, which appears on some of the later stelæ. He may also wear a collar, but this, like the disk and uræus, is part of the equipment and not intended to represent the markings.

The design on the figures of Apis is undoubtedly that to which the markings of the calf had to approximate in order to establish his divinity. This is pointed out by Mariette, in *Le Sérapeum de Memphis*, p. 127, where he gives two illustrations, one of the bull as portrayed in bronzes and another as painted. Discussing these, he says (beginning with the latter) : " Il a le triangle blanc sur le front (Herodotus was in error here[1]) ; sur le poitrail parait l'une des deux cornes du croissant lunaire ; un autre croissant se dessine sur le flanc, et enfin les poils de la queue sont *doubles*, c'est-à-dire qu'ils sont alternativement blancs ou noirs. . . ." He then describes the design on the figures. His explanation of the hairs of the tail being double is probably correct. The design on the flank is unlikely to be a crescent moon, as it is the natural complement of the black markings representing the vulture, the scarab and the saddle. If he is right about the crescent on the chest, this may explain why there is no crescent below the disk on the bull's head.

Unless animals were bred for these markings, and we are sure that they were not, the approximation cannot have been very close, but no doubt to the eye of faith it was satisfactory. Perhaps for public occasions the designs were touched up by the priests.

M. Chassinat has pointed out the connections between Apis, Ptah, Osiris, the moon and the Nile (*La mise à mort rituelle d'Apis*, Rec. de Trav., Tome XXXVIII, pp. 33–60), and here he discusses in great detail the probabilities about the death which Apis suffered. He comes to the conclusion that the end of the bull's life was Apotheosis by drowning[2] and that

[1] Mariette translates " triangle " from Herodotus and on this point Mr. Last writes : In Herodotus III, 28, 3 the manuscripts read τετράγυνον—i.e., tetragon. Other authorities, however, say that it was triangular ; and, to make Herodotus agree with them, modern scholars have often accepted the conjecture that τετράγυνον in the MSS. is a corruption of τι τρίγυνον—" a certain triangle."

[2] See F. Ll. Griffith, *Herodotus II*, 90. *Apotheosis by drowning*, in *A.Z.*, XLVI, p. 132.

this practice was customary before the end of the Nineteenth Dynasty. He affirms that Apis was obliged to die at the age of twenty-eight, as did the god of whom he was the incarnation (Osiris). Plutarch's statement (*De Iside, etc.*, LVI) that Apis *lived* twenty-five years, is interpreted by M. Chassinat, in the light of the statements by other classical authors that he was drowned (Pliny, *N.H.* VIII, 46. Ammianus Marcellinus, XXII, xiv, 7, and Solinus, 32), as meaning that he *was not permitted to live* beyond that period. He explains the discrepancy between the twenty-eight years life of Osiris and the twenty-five years life of Apis by the supposition that the custom with regard to Apis had altered at the time when Plutarch was in Egypt, though the traditional story of Osiris had remained in its original form. Thus he evades the difficulty, created by the two bulls which were shown by Mariette to have lived to the age of twenty-six, without discrediting Plutarch, on whose credibility he relies for much of his argument.

The difficulty in accepting his conclusions lies in their extremely hypothetical nature. If it were customary to drown the sacred bulls when they reached the age of twenty-eight years, then it was a custom that was never practised, for no known Apis or Buchis lived so long. It is possible that a bull with remarkable longevity *might* have been prevented from attaining more than twenty-eight years of life, but to such possibilities there is no end. Moreover, M. Chassinat depends for his argument partly on certain phrases in bull and cow stelæ which, he argues, infer that the animal was drowned. There is no regularity in the lives of the bulls and if they were drowned at some period anterior to twenty-eight years, it is strange that the age should not have been fixed. It is possible that in order to complete the ritual a bull would be hurried forth at the first sign of approaching death and drowned,[1] and this would have to mean, in practice, the first illness of the bull. But, if this were the case, it is amazing that any bull lived as long as twenty-six years. Moreover, Hopfner (*Der Tierkult der alten Ägypter*, Leipzig, 1914), writing of the classical period, is of the opinion that no divine animal was sacrificed, and in support of this quotes (p. 84, n.) Diodorus, I, 84, who mentions that shortly after the accession of Ptolemy I an Apis died of old age at Memphis.

Whether the bull was drowned or not at an earlier date, there is evidence which points to his being ceremonially eaten, at least in the Nineteenth Dynasty.[2] The relevant passage in *Le Sérapeum de Memphis* (pp. 63 and 64), by Mariette, is of such importance that it is worth quoting in full : Mariette has described the examination of three successive sarcophagi, the first of which was inscribed with the names of Khā-em-Uas and of Apis. He is in the process of clearing an unrobbed solitary tomb of Apis of the Nineteenth Dynasty :

" Quand la troisième de ces enveloppes successives eût été enlevée, je vis paraître une grande boîte de momie, le visage doré, sans uræus et orné sur la poitrine d'une légende coupée à angle droit par quatre légendes plus petites. Ces quatre légendes ne contenaient que les noms des quatre génies de l'enfer [*sic*] égyptien. Quant à la plus longue, on y lisait : ' Voici Osiris Apis, celui qui réside dans l'Amenti, le dieu grand, le seigneur éternel, le dominateur à toujours.'

" J'acquis donc ainsi la certitude que j'avais devant moi une momie d'Apis, et en conséquence je redoublai d'attention. Je pris le couvercle de ce cercueil par les pieds, un autre le prit par la tête, et nous le soulevâmes. Mais, à mon grand étonnement, je reconnus que cette partie supérieure n'était qu'une moitié de cercueil, et que ce couvercle posait directement sur le sol.

[1] Cf. the practice in the tribes who kill their kings.

[2] Prof. Margaret Murray first suggested to me that Apis might have been eaten at death.

Seulement, comme le monument était considérable, on avait ménagé par dessous et dans l'épaisseur du bois une cavité qui avait environ sept pouces de profondeur, un peu plus de quatre pieds de longueur et deux pieds environ de largeur ; de telle sorte qu'en soulevant le couvercle je ne trouvai sur le rocher qu'un monceau tout noir, *qui avait conservé la forme et les dimensions de la cavité dans laquelle il était logé.*

" Mon premier soin fut de chercher une tête de taureau ; mais je n'en trouvai pas. Une matière bitumineuse, très odorante et qui tombait en poussière sous la moindre pression de la main, enveloppait une quantité de petits ossements déjà brisés à l'époque de l'ensevelissement du taureau. Au milieu de ces ossements, répandus dans la masse sans ordre et au hasard, je recueillis : 1° quinze statuettes funéraires, à tête de bœuf, avec légendes au nom d'Apis mort ; 2° une dizaine d'objets en or gravés au nom de Kha-em-Uas et de divers autres personnages occupant de hautes fonctions à Memphis ; 3° plusieurs statuettes en schiste verdâtre représentant le prince lui-même ; 4° d'autres statuettes de même matière représentant d'autres princes de la famille royale ; 5° enfin des amulettes en cornaline, en quartz rouge et en serpentine, finement gravés. Dans la masse avaient été déposées une grande quantité de paillettes d'or."

Again, in describing the second burial in the same tomb, he says :

" Les mêmes observations se présentèrent quand je découvris la toile qui enveloppait la masse bitumineuse de l'intérieur. Pas de tête de bœuf, pas de gros ossements ; au contraire, une profusion plus grande encore de petits os brisoés. Mais au lieu des bijoux, des statuettes et amulettes de l'autre sarcophage, je ne découvris qu'un naos en or, à émaux cloisonnés, et portant en dessous de la frise le cartouche-prénom de Ramsès II ; il était accompagné de six statuettes funéraires à tête de taureau."

Mariette's description italicised by us above, of the mass retaining its original shape after the lifting of the cover, is sufficient evidence that he cannot be accused of finding a fragile mummy which fell to pieces when the cover was lifted. The form of the remains is puzzling because the head was not found complete. If this were a case in which the animal was eaten, it would be expected that at least the greater part of the skull would have been intact, as it was in the burial of King " Horus " (Horemheb) of the Eighteenth Dynasty. The ordinary sacrifices in the Egyptian temples were eaten by the priests as a matter of course, but this would not explain the curious state of the bones. In the Pyramid texts there is a description of the dead king eating the gods in heaven. If our supposition is right that Apis was eaten by the king, who wished to gain the strength and fertility of the god, the " Cannibal Hymn " provides a satisfactory explanation of the state of the bones. The following lines are quoted from Mr. Faulkner's translation of the text in *J.E.A.*, Vol. X., Part ii, p. 98 :

1. 401a. It is " Grasper-of-Horns " who is in *Khȝw* who lassoes them for Wenis.

. . . .

402b. He cuts out their intestines for him.

. . . .

403c. It is Wenis who eats their magic and swallows up their spirits.

. . . .

404d. Their old men and old women are for his incense burning.

405a. It is the Great Ones who are in the north of the sky who place for him the fire.

405b. To the kettles containing them with the thighs of their oldest one.

409b. He has smashed the vertebræ and the spinal marrows.
409c. He has taken the hearts of the gods.
410a. He has eaten the Red Crown, he has swallowed the Green One,
410b. Wenis feeds on the lungs of the Wise Ones.
410c. He is satisfied by living on hearts and their magic.

. . . .

413b. His surplus of food is more than (that of) the gods, being cooked for Wenis with their bones.

. . . .

Much not quoted here deals with the strength and power which the king thus gains by sympathetic magic. The smashing of the bones into small pieces and the disappearance of some of them is easily explained if it be accepted that the king ate Apis in the manner in which the earlier kings were supposed to have eaten the gods. There is further evidence from the Serapeum in favour of this argument. Describing the tomb of Apis of Seti I, Mariette (*op. cit.*, p. 137) says :

" Le caveau . . . avait pour annexe une cellule latérale, de mêmes dimensions que celles d'Horus, et inviolée comme celle-ci. Mais au lieu d'un tombeau d'Apis, j'y ai rencontré quatorze vases très grands, amoncelés sans ordre apparent au milieu du souterrain.

" J'ai cru, avant d'ouvrir ces vases, qu'ils contenaient les quatorze parties réservées d'un Apis, dont le corps, à l'exemple de celui d'Osiris, avait été coupé en quatorze morceaux. Mais à l'inspection des matières qui y étaient contenues, j'ai reconnu que les quatorze vases de Séti Ier. rentraient dans la catégorie des nombreux monuments de cette sorte qui ont été retrouvés dans les autres parties du Sérapéum, et qu'ils n'avaient jamais servi qu'à conserver de l'eau consacrée par la présence des cendres ou des ossements provenant des victimes immolées."

Are these bones and cinders the " thighs of their oldest ones " ?

Herodotus's statement that bulls of the same kind were buried with Apis does not affect the argument, for he may be referring to the burial of ordinary cattle in the neighbourhood which took place during the late period.

The large jars described by Mariette were in the chamber which, by comparison with the burial of the time of King " Horus " (Horemheb), should have contained Apis himself, and it is possible that the bones they contained were Apis's own bones used for fuel rather than the bones of other bulls.

It is noticeable that the earlier burials are poorer. The unrobbed tomb of Horemheb, mentioned above, contained only four canopic jars in addition to the wooden coffin which was inside a rectangular limestone enclosure.

After the time of Prince Khā-em-Uas, Mariette does not describe the remains of the bulls, but we know from the evidence of *The Apis Papyrus*[1] that a complete system of mummification was practised at the time of Apries and Amasis, and it is highly probable that this was the date at which mummification was begun. That is the time when stone sarcophagi were introduced.[2]

All this shows a cult gradually evolving, but the poverty of the burials and the absence of mummification at the early stages must be attributed to changing ideas rather than to lack of

[1] See footnote on p. 18.
[2] Mr. Faulkner suggests that this change may have been due to the increased attention to animal worship which began at that time.

technique in these matters at the date when the Serapeum began, because the system of mummification for human burial was well advanced at that date, and there must have been ample wealth to supply Apis with as fine a burial as could be desired. That at the first incarnation of Apis the priests should have destroyed the flesh, chopped the skeleton needlessly into small pieces, arranged these pieces into a pile and put a box over it, is so foreign to everything we know of Egyptian customs that no such hypothesis need be entertained. But it seems almost as unlikely that in the sophisticated times of the Eighteenth Dynasty they should have ceremonially eaten the first incarnation of the bull and buried the remains with inscriptions in the bull's honour. If Apis were treated by the priests as an ordinary sacrifice, the meat becoming their perquisite—an unlikely supposition at the best—the remains would hardly have received a ceremonial burial.

There is, however, an explanation that fits all the facts, and the evidence may be summarised as follows :

(1) There are the piles of ox bones, surmounted by a head, in the early predynastic period, and another example of uncertain date found by Professor Peet at Abydos (*Cemeteries of Abydos*, Part III, p. 44).

(2) The earliest known Apis burials, though they had a superstructure and two chambers, each contained only four canopic jars, a wooden coffin and a similar pile of bones.

(3) The great difficulty in accepting incarnation of any bull god earlier than the known mausoleums has been that of the disposal of the body in the earlier period. Any large underground mausoleum similar to the Bucheum and the Serapeum could hardly pass unnoticed, nor could a large series of individual tombs of the size used in a bull burial.

(4) A number of burials of piles of ox bones could easily pass without great comment, or, in the last century, without comment at all.

(5) The remains found in the Serapeum correspond closely with what would be expected to result from an actual Deivorous feast similar to that optimistically prophesied in the Cannibal Hymn. Deivorous features are common to most religions and are even prominent in some branches of the Christian faith.

All these facts are correlated if we accept the following hypothesis : Apis was incarnate from a very early date, possibly predynastic, and was ceremonially eaten, probably by the king, at least until the Nineteenth Dynasty and probably till the Twenty-sixth. Ceremonial burial of Apis was not begun, upon any scale, till the Eighteenth Dynasty, and from that time became rapidly more and more like a human burial. Mummification was adopted later, probably in the Twenty-sixth Dynasty, the second method of Herodotus being employed. According to Diodorus (I, 84) the mummification of Apis cost 100 talents, which is a large sum, while according to Herodotus this method was cheaper than that in which evisceration was practised. It is probable that Herodotus was misled in this matter. From this time onwards, Buchis died a natural death, or was formally drowned when at his last gasp, perhaps only by proxy. During the earlier period canopic jars were used, showing that the bull was eviscerated, but there is no evidence of evisceration after the process of mummification was introduced. It is possible that the building of a large underground mausoleum for Apis, open to the public on certain occasions, may have been part of the process of democratising many things (previously reserved to the king and his family) that was taking place about this date. Mummification, though previously practised by the nobles, is the best known example. By the creation of an official institution for the burials

of Apis, the public were being admitted directly to the beneficial fertility instead of receiving it indirectly through the king.

Against this theory there is little evidence. It has been shown above that the evidence, from classical sources, for the theory that Apis was drowned at any fixed age is weak and unsupported by the results of excavation. The travellers who stated that Apis was drowned were probably wrongly connecting the twenty-five year life of Apis, which was simply his allotted span (like man's three-score years and ten) with the fact that certain sacred (but not divine) animals were known to be sacrificed. Possibly the tradition of earlier sacrifices, such as are suggested here, combined with the *tabu* against Apis drinking Nile water, helped in the formation of such ideas. As suggested above, drowning by proxy, or formal drowning when the bull was dying might have been practised. (See Hopfner, *Der Tierkult der alten Ägypter*, p. 83). Drowning might have been the method of killing used in earlier times, but would have produced an unpleasant meal if the bull were eaten afterwards as suggested here. References to the living bull have not been traced in the periods preceding the existence of the Serapeum, but those which we have, apart from the official stelæ, are mostly the accounts of foreign travellers, and there were no such records before the Greek period.

There was a curious burial in the Serapeum which brings added strength to our supposition. It is worth quoting Mariette's description in full (*op. cit.*, p. 58) :

" Ce déblaiement (the blowing-up of an obstacle with gunpowder) a donné lieu à une découverte sur la valeur de laquelle j'éprouve jusqu'à présent assez de difficulté à me prononcer.

" Précisément à l'endroit où la voûte s'est effondrée, on a trouvé un sarcophage de bois et une momie humaine. Le sarcophage, encastré assez profondément dans le sol, avait eu toute la partie supérieure broyée ; mais la momie, avec tous les objets qui composaient sa parure funéraire, n'avait pas été touchée. La seule détérioration qu'elle avait subie provenait de l'humidité du lieu.

" Un masque d'or couvrait le visage. Une colonnette de feldspath vert, une boucle de jaspe rouge, étaient suspendues à une chaîne d'or passée au cou. Une autre chaîne d'or soutenait deux autres amulettes en jaspe, le tout au nom du prince Khā-em-Uas, fils de Ramsès II. Un admirable bijou, épervier d'or à mosaïques cloisonnées, les ailes étendues, était posé sur la poitrine. Dix-huit statuettes de faïence, à tête humaine, et avec la légende ' Osiris-Apis, dieu grand, seigneur de l'éternité,' étaient répandues à l'entour."

Mariette continues to discuss his surprise at finding the mummy of a man in a tomb of Apis, and puts forward various hypotheses as to why a man should have been buried there. Later in the book, however (p. 146), evidently after examination of the mummy, he says :

" L'autre (momie) est mort par conséquent en l'an 55, et cette remarque a de l'intérêt si, comme il pourrait se faire, la momie dont j'ai recueilli les débris, au lieu d'être celle d'un Apis, était celle du prince Khā-em-Uas lui-même. Ce point nouveau mériterait de longues explications. Qu'on se figure une momie de forme humaine, détruite dans toute sa partie inférieure à partir de la poitrine. Un épais masque d'or, aujourd'hui au Louvre, couvrait le visage. Au cou étaient passées deux chaînes également en or à l'une desquelles trois amulettes étaient suspendues. Quant à l'intérieur, il ne présentait plus qu'une masse de bitume odorant, mêlée d'ossements sans forme au milieu desquels furent trouvés deux ou trois bijoux à cloisons d'or, emplies de plaquettes de verre." Here he mentions finding a scarab, some funerary statuettes in human form, and one or two other objects and then goes on to say :

" Voilà notre Apis, et on aura la mesure de l'embarras dans lequel cette découverte doit nous mettre quand on saura que, tandis que tous les monuments trouvés sur la momie ne portent rien autre chose que le titre et le nom de Khā-em-Uas, tous ceux au contraire trouvés dans les environs mentionnent le nom et les qualifications habituelles d'Osorapis. Est-ce là un Apis ? Est-ce là la momie de Khā-em-Uas. . . .? "

Though it would be necessary to examine the bones to be absolutely certain whether they belonged to a bull or to a man, there is little room for controversy on this subject. The burial of a royal mummy in any but complete form would have been unthinkable in Egypt. Only a man's enemy would have destroyed his body before burial, and he would not have buried the remains with the full rights of Apis. There can be no reasonable doubt that the bones were those of an Apis, buried to imitate in many ways the body of the prince. To this day, when a Copt recovers from a serious illness, a calf is slain, and the convalescent steps over the body, so that the evil spirit may leave his body and enter into the blood of the slain. May not this burial have been a substitute burial for Khā-em-Uas ? The prince, being ill, seeks a cure by paying great attention to Apis, and finally Apis is slain, eaten by the prince to give him strength, and the remains are buried " with the illness " of the prince ? It seems almost impossible to find any other explanation for this extraordinary burial, and that put forward here, while fitting all the facts, confirms the theory of the death of Apis already propounded.

The first burial in the Serapeum to contain a granite sarcophagus belongs to the Twenty-sixth Dynasty, the date to which the description of mummification in *The Apis Papyrus* refers. Prior to this, wooden coffins were exclusively used. Psamtek I started a new series of chambers in the Serapeum on a much grander scale than those of his predecessors. Nekhthorheb paid much attention to the place and built a small temple near the entrance. These great chambers of Psamtek lasted till the middle of the reign of Euergetes II (Ptolemy VII). Mariette refers in one place to the Serapeum existing until the time of Theodosius, and in another to burials up to the time of the last Roman Emperors, but, on account of the incomplete state of his publication, we do not know what he found of this late date.

Our ignorance of the objects which Mariette found is deplorable. Among the objects referred to by him in the book (which do not occur in his MS. catalogue at the Louvre) many were possibly not considered worth saving, and it is probable that excavation of his dump-heaps and re-excavation of all the tombs not open to the public would be profitable. Three burials of about the time of Rameses XIV[1] he left uncleared, and there is no publication of later work upon these. It is probable that such an excavation would produce more material, certainly more evidence about Apis and bull worship, than is to be found in Mariette's work.

The most important objects which are traceable are the official stelæ, of which only eight were reconstructed, including two of Ptolemaic date. One hundred and twenty private stelæ were found, mostly in demotic. These have been published in collected form. May we suggest, with all due diffidence, that it is the duty of our French colleagues, no less to the memory of Mariette than to Egyptology in general, to collect all that remains, both in information and objects, from Mariette's great unfinished task and to publish it fully and without delay ? Such a course is imperative if further work on the subject of bull worship is to be done.

The list of objects found by Mariette is too great to publish here, even in an abbreviated form, and those objects of importance for comparison are referred to as the need arises.

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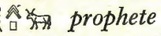
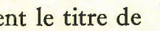
[1] Mariette's chronology.

It is known that the Serapeum grew to be one of the biggest religious centres of Egypt. Within the sacred precincts were small establishments for many of the gods and there was an incubating centre where those who were ill went to dream what the remedies for their sickness might be. That the establishment continued at least till the time of Theodosius I is very probable, and an Apis is recorded in A.D. 362 by Ammianus Marcellinus (XXII, 14, 6) but we do not know if Mariette excavated any burials of Roman date. The absence of any official stelæ of the period make it improbable.

Mariette was lamentably uninterested in cow burials, presumably because they were poorer in objects than bull burials. No cow stelæ of the Serapeum are known, and it is possible that the cows had no stelæ there, especially in view of the cows being represented on the bull stelæ (frequently with human bodies and cows' heads). In *Le Sérapéum de Memphis* the author only once makes a casual mention of cow burials, but he is more explicit in the *Mémoire sur la mère d'Apis*. On p. 14 he says : " J'ai trouvé, dans un hypogée de vaches, situé au nord du Sérapéum la tombe inviolée d'un personnage qui, au milieu d'une série pompeuse de titres, prenait celui de  *prophete de la mère d'Apis* ; une stèle du Sérapéum, aujourd'hui au Louvre, a été redigée au nom d'un autre personnage nommé Ounnofré, fils de Pétosiris, lequel prend également le titre de  *prophète des mères d'Apis*. En ceci, les monuments sont donc d'accord avec Strabon. . . . Notre déesse a tête de vache, a la main armée du sceptre ordinaire des divinités, telle qu'on la voit sur les stêles du Sérapéum . . . (est la) mère d'Apis."

It is a pity that Mariette's account of the excavation of this mausoleum is not fuller, for at present it is uncertain if it was the burial place of the mothers of Apis, as seems probable, or only one of the cemeteries of humbler cattle which surround the Serapeum. The alleged virginity of the mother of Apis is discussed elsewhere in this chapter.

Nekhthorheb paid special attention to the Serapeum and it is in his reign that we first encounter Buchis and the Bucheum, though prior to this we have evidence for the existence of the bull of Madamūd, who later is to be equated with Buchis. The bull of Madamūd is shown in procession during the reign of Rameses III. This cannot be regarded as definite proof of the existence of an incarnate god in bull form at that date, but it provides strong evidence for that view. There was a bull cult at Madamūd in the Twelfth Dynasty. Fairman is of the opinion that prior to Nekhthorheb there was a peripatetic bull visiting Armant, Madamūd, Ṭôd and Thebes, and gives the evidence for this in Vol. II, pp. 45–50. It is reasonably certain that there is no further Bucheum within the present concession of the Society, and if an earlier cemetery exists, it is probably in the neighbourhood of Ṭôd and Madamūd. Wherever it may be it is extraordinary that it should not have been discovered by robbers during the orgy of plundering which has taken place during the last thirty years. If the bull existed as a living animal between the times of Amenhotep III and Nekhthorheb, then this cemetery should be easy to find, though burials of an earlier date might be easily overlooked, as has been shown.

It must remain open to doubt whether Nekhthorheb gave new impetus to the worship of the bull of Madamūd, under the new name of Buchis, and provided him with a new burial ground at the Bucheum, or whether the same king introduced the idea of the god incarnate in the bull in imitation of Apis and Mnevis.[1] If the latter was the case, it was done partly no doubt in order

[1] Miss Murray considers that since the four bulls were worshipped from such an early date they were probably all incarnate long before Nekhthorheb's reign.

to curry favour with the South, to which he was alien. The balance of evidence as to the similarities and differences between Buchis on the one hand and Mnevis and Apis on the other is so delicate that nothing can be deduced from it.

Whether there was an incarnate bull at Armant before the reign of Nekhthorheb or not, the changes made at that time were so fundamental that it is safe to treat this reign as the beginning of the history of Buchis.

Buchis was selected from among the calves of a suitable age by certain markings which distinguished him from other cattle. According to Macrobius (*Saturn.* I, 21, 20), he was said to change his colours every hour, and was stated to be " shaggy, with hair which sprouts outwards, contrary to the nature of all animals." He was almost certainly white with a black head. The first part of the description we may discount as a dragoman's tale, but the second no doubt bears some relation to the facts. Partly because of bad conditions in the soil, and partly because of inefficient mummification, we were not able to find a single portion of the skin of either Buchis or his mother. Dr. Jackson in his report upon the osteology finds no skeletal abnormality. The bones resemble most closely those of the Mesopotamian and Asia Minor oxen of the Bos Brachyceros race, which are short-horned, humped cattle. No particular locality was favoured in the selection of the Buchis. Two bulls were born in Armant, the second bull of Augustus and the bull of Tiberius, and two were born in " the Southern City " (possibly Thebes), one in the reign of Ptolemy VI and one in the reign of Ptolemy VII. The name of the owner of the land on which the bull was born is sometimes given on the stelæ, and it is probable that such an event must have been a source of great gratification, pecuniary as well as spiritual, to the owner. The bull's mother was highly honoured, and was undoubtedly kept in the temple precincts at Armant.

The attention paid to her is readily comprehensible if we accept for her the position of a virgin mother attributed to the mother of Apis. On p. 20 of *Mémoire sur la mère d'Apis* Mariette discusses this question at some length, accepting the evidence of the classical accounts, and considering that they were confirmed by the stelæ and other remains at the Serapeum. He quotes Herodotus[1] (III, 28), Pomponius Mela (I, 9, 58), Ælian (*Hist. anim.* XI, 10) and Plutarch (*Quæst. conv.* VIII, 1, 3–718b). He quotes one of the Serapeum stelæ which describes Apis as " thou who hast no father " and maintains that this is meant in the carnal sense of the word.[2] On p. 53 he maintains that Apis was born of his mother by Ptah, who conceived Apis, appearing to his mother as celestial fire. The mother of Apis was thus kept as a virgin throughout her life. George Rawlinson translates the passage in Herodotus as follows : " Now this Apis . . . is the calf of a cow which is ever afterwards unable to bear young. The Egyptians say that fire comes down from heaven upon the cow, which thereupon conceives Apis " (Book III, 28). Plutarch, *De Iside, etc.*, XLIII, says : " Apis, they say . . . is conceived when a generative light falls strongly from the moon, and touches a cow that is in heat." Lacking knowledge of the supposed parenthood of Buchis, it is best to assume that it was similar to that of Apis.

This conception of a miraculous birth makes clear the reasons for the care taken in verifying the marks on the newly-born Buchis. If a calf were being *chosen* to be the incarnation of a god,

[1] Mariette's references have been corrected throughout to conform with modern usage and we are indebted to Mr. Last for the necessary information.

[2] This statement is not true, however. The passage in question reads :—*i'rt sntr i'nḏ ḥr.k Ḥp ꜥnḫ Tm ḫprw tpi' n Wnn-nfr*, " Offering incense, Hail to thee O Living Apis, Tum, first form of Onnophris." The three dots under the scarab, which Mariette considers proof of the carnal nature of the relationship, are merely the plural strokes of *ḫprw*.

the spirit descending at some consecration ceremony, or at the installation itself, a reasonable resemblance in marking to the requisite standard would be sufficient, but with a miraculous birth no doubt about the accuracy of the priests' choice could be permitted to arise at a later date. We have evidence of this care from the stela of the second bull of Ptolemy VI. When he was born, he was taken to his home town (Asfūn) where he was met by " the priests, the Royal Inspectors, and the soldiers of the Two Great Houses." There is no doubt that this body was a commission sent to verify the authenticity of the calf. Presumably the owner had to attest that the heifer had never been covered by a bull. A similar commission is recorded in the case of an Apis. It seems possible that the Royal Inspectors were appointed as independent witnesses to prevent fraud and collusion. Is it possible that the same men acted at the identification of all the sacred animals? Such a supposition seems more probable than that they combined this with other duties.

The nature of the ceremony of installation for Buchis is not by any means clear, but it was undoubtedly an important one, at which the king was said to attend. He may quite well have done so during the Ptolemaic period, for the event would not occur more than twice in a king's lifetime, unless he attended at the installation of every sacred animal.

The bulls of Nekhthorheb, Ptolemy IV and the first bull of Ptolemy V, were installed at Armant, but all other installation ceremonies of which we know the site took place at Thebes.[1] In the second stela of Ptolemy VI, Thebes is described as " his place of installation from time primeval." This is the period at which Buchis became connected with the eight gods of Thebes and a general change in his attributes took place. In the same stela there are mentioned two installation ceremonies additional and subsequent to the inspection referred to above, and these are discussed below.

After the installation, usually very soon after, the bull was rowed in a sacred bark[2] from Thebes to Armant, and an august assembly travelled with him. Thus the bull of Ptolemy VII " was installed by the king himself. Going on the bark of Amūn together with the boats of the king, all the burghers of Thebes and Hermonthis, prophets and the chief priests being with him." Likewise the first bull of Augustus was installed by Kleopatra the Great and her boy husband, Ptolemy XII. " He was installed by the king himself in year 1, Phamenoth 19. The queen, the Lady of the Two Lands (Kleopatra), the goddess who loves her father, rowed him in the bark of Amūn, together with the boats of the king, all the inhabitants of Thebes and Hermonthis and priests being with him." On most of these occasions the actual presence of the king must be taken *cum grano salis*, for Buchis is said to have been accompanied by the king himself during the reign of Tiberius. Possibly the king was officially represented by an important deputy. From the difference in the formula, it is judged, by Junker, Tarn and Fairman, that Kleopatra VI did accompany the bull in person. Dr. Tarn is writing upon this in the *Cambridge Ancient History*, X, 36[3]. In the stela of the second bull of Ptolemy VI (Inscription No. 9), referred to above, the phrase occurs " The ceremony of installing him (Buchis) was performed by his own priests . . . an official decree having been made in the presence of His

[1] The Apis bull of Ptolemy VI spent twenty-four hours in the Temple of the Nile at Heliopolis immediately prior to his installation in the Temple at Ptah at Memphis.

[2] Pl. CIX, Fig. 1 shows a stone carving of a sacred bull in such a bark, which was a reproduction of that in which the god made his lunar journey in the other world.

[3] We are indebted to Professor Adcock for this reference.

Majesty." Subsequently, the king came to Thebes and a second ceremony was performed. The latter event took place in year 24 and the bull was born in year 19, but these are the only two events which can be dated, so that it is not possible to say how the intervening period of nearly five years was divided between the previous ceremonies: the inspection (see above) and the first installation. It seems clear that the king or his deputy was unable to be present when the priests wished the bull to be installed, and that by special royal decree they were permitted to perform the ceremony themselves. If this ceremony occurred soon after the inspection, it would appear that it was not altogether valid and the bull remained at Thebes until the king was free to perform the proper ceremony; but, if the two installations were in close succession, some event must have made it possible or necessary for the king to appear personally very soon after the installation by the priests. In either case, the course of events much strengthens the view that the king attended installations in person, at least in the Early Ptolemaic period, for there would hardly have been so much trouble over the substitute of one deputy for another.

Two events described upon the stelæ are of exceptional interest. The first occurred in the life of the first bull of Ptolemy VI: " He reached Thebes in year 2, Paopi 15. There was an attack by many foreign countries against Egypt in the year 12, and great civil strife broke out in Egypt. The great wall of Thebes was manned by foreigners. Thereupon the burghers of Hermonthis came to Thebes the mighty. Then their hearts were sore afraid for this god, and they performed the ceremonies of transporting him to Hermonthis in year 12. . . . May he remain on his throne for ever." The events referred to are the invasion of Egypt by Antiochus IV in 169 B.C., and the civil war between Philometor and his brother. The " foreigners " might well be Greek mercenaries, employed by one or other of the contending parties. Either hostilities were not very active (if fighting actually took place at all) or the god and his attendants were allowed to pass through the lines. Unfortunately the other event of interest occurs in the stela of Domitian acquired by purchase from a dealer for the British Museum in 1906. The text can only be partially read owing to dirt still adhering to the surface which it was not possible to have removed in time for the stela to be re-copied and included in this volume. A provisional translation is included, and this gives some idea of the interest of the text. There is a description of a great festival, but it is not certain on what occasion this took place, whether at the bull's installation or death. " There were many horses more numerous than the sand, troops more numerous than the sands of the shore." Some of those who accompanied him are described as *'Iwntyw*, and Fairman suggests that these may be musician priestesses. In the demotic accounts, which were found on an amphora, occur " The Dancing Musicians of Amūn," " The Dancer " and " The Singers of the Temple." It may be that these are they to whom reference is made. There is also mention in the Domitian stela of adorning Buchis's head with the double feather crown.

" Hermonthis and the beautiful Thebes were united in drunkenness and the noise was heard in heaven. Then he turned back to his city (Armant) in joy in order to assume his throne in life for ever . . . and his kingdom had the duration of Rēʿ."

Apart from his birth, installation and death, the other events and the daily routine of Buchis's life have not yet been clearly illuminated. Information may be expected as a result of the French excavations at Ṭôd and Madamūd, but still more from our projected work in the town of Armant.

Fairman shows that Buchis was peripatetic. He united in his person the males of the

Ogdoad. The four local forms of Mentu were united in this single bull, and as he visited each town he became the bull of that town. Nevertheless each bull retained some of its individuality. Each temple, with the possible exception of Armant, had a statue of the bull, which, no doubt, served to represent him when he was elsewhere. It is suggested that he visited each place once a month, but from the stela of Ptolemy VI, already quoted, it appears that he spent ten years in Thebes. He was not chief god of any of these places ; he is never referred to as Lord of Thebes, of Madamūd, or even of Armant, but only of the House of Atum, which was the ancient name for the Bucheum.

From the demotic accounts it appears that the revenues of the temple of Armant, where Buchis resided (the accounts seem to be too large for the Bucheum alone), were rather larger than those of the temple at Tebtunis. As at the temple of Sebek in Lahun in the Middle Kingdom, twenty officials drew pay regularly. In addition, other people were paid by the various priests. Among the most interesting of these are " The Fodderers," undoubtedly those who supplied the green food essential for the health of the animal. An item occurs which may be the ration of corn for Buchis, but it would be enough to keep any bull for eight months, and, even allowing that his mother's ration was included and that they were both overfed, the amount seems to be excessive. A considerable amount of weaving is also paid for, and some of this may have been for use in the temple of the living Buchis. The dancer, dancing musicians of Amun and the singers of the temple have already been mentioned.

The question of Buchis's position in the hierarchy of Egyptian gods is a sea of difficulties. At the time from which most of the information about this god is derived, and *all* the information about Buchis by name, the gods of the Thebaid had become almost inextricably mixed. Even the interrelationships of Amūn, Min and Mentu have not been properly disentangled, though these gods are known from early times.

Fairman, in his note on the titles of Buchis, clarifies some of the issues ; he shows that Buchis was the earthly representative of Rēʿ, the sun god. The exact shade of meaning which should be given to this attribute is debated both in connection with Buchis and Apis. Various interpretations have been given, the *locum tenens*, *l'intermédiaire vivant*, *die Wiederholung*, second life, manifestation, representative, and incarnation. Of Buchis's attributes the solar are the earliest which can be traced and seem to precede his connections with Mentu. He is probably to be equated with the White Bull, and *might* have a Lower Egyptian origin and even, possibly, be descended from the White Bull of the Palermo stone. Buchis's connection with Min is stronger than with most of the gods of the Ennead, as would be expected from a fertility god. In the late period he became most strongly associated with Mentu, the Lord of Hermonthis. At this time he had a maze of connections, being the incarnation of the Ogdoad, their son, their father and their grandfather, but Fairman summarises these attributes in the section mentioned above, and there is no necessity to enumerate them here. In considering Buchis's origins there is one fact of interest which came to light in Baly's investigation of the early traveller's accounts of Armant. M. Granger, *Relation du Voyage fait en Egypte en* 1730, Paris, 1745, pp. 70–71, says : " There is to be seen near by (to the temple) a fine basin built of squared stone which is forty feet long by thirty broad, in the middle of which is to be seen a column, of which only half is still standing." C. L. Irby and J. Mangles, *Travels in Egypt and Nubia*, London (1823), p. 136, state : " Near the temple, on the east side, are the ruins of an ancient basin, in the centre of which Denon mentions, on the authority of Aristides, there was a Nilometer, but the column

on which it was graduated is not visible now. . . ."[1] It is evident that the temple lake contained a Nilometer such as existed in the lake at Memphis connected with the temple in which Apis was worshipped. Apis's connection with the Nile is well known, and a similar association in the case of Buchis is not unlikely. The two great sources of fertility in Egypt, the sun and the Nile, were both associated with Apis, but especially the Nile ; with Buchis the sun predominated, as it did with Mnevis at Heliopolis. Armant was a centre of sun worship in the Eighteenth Dynasty, and Fairman suggests that it was when the Heliopolitan sun worship spread that the Egyptians, with their passion for parallelism, set up the solar bull cult of the North at Armant. It is equally possible that Armant was chosen as a centre for the Aten worship because of the essentially solar nature of the Buchis cult, and of the local cult.

As has been seen, the king was present actually, or by deputy or courtesy, at the induction of Buchis, and there can be no doubt that the latter was a god of considerable importance in the country. That he suffered a loss of revenue in the middle of the reign of Ptolemy V seems apparent from the tombs of that date (L+K). This may have been the result of taxation imposed by the king to assist him in his foreign wars, but may also have been due to the priests of Buchis becoming involved, either through necessity or deliberately, with the dynasts who were in rebellion during the earlier part of this Ptolemy's reign. About this date a robbery took place, the damage of which was later repaired. It is known that Armant joined the losing side in the trouble between Ptolemy VII and Kleopatra II, and immediately after this indiscretion the poorest Ptolemaic burial in the Bucheum was made. There was a revival in the middle of the reign of Tiberius and the resultant prosperity continued until the time of Caracalla.

Only one aristocratic family is known with constant associations with Buchis—the Kalasiris family, whose names occur on the official stela of the first bull of Augustus and elsewhere in connection with Buchis. It was in " the byre of Kalasiris, son of Kalasiris," that the second bull of Antoninus Pius was born. It is impossible to connect the two families, but by no means impossible that they were connected. In the Bucheum there was nothing on the same scale to correspond with the immense votive activity at the burial of each Apis, but there is evidence of private devotion.

A small private hieroglyphic stela was found, which was unfortunately untranslatable (Inscr. No. 23), a sandstone stela with two names on it in demotic, a number of sandstone miniature stelæ with stylised designs and several pebbles with names on them. In addition to these we were fortunate in finding a broken chert pebble with a hymn to Buchis in demotic. A literal translation of this by Mr. Mattha is given in Vol. II on p. 56. As the poem has some slight literary merit, and is of great interest in relation to the matter under discussion, I have reproduced below a freer version of this. The chief alterations are the correction of the author's indiscriminate use of pronouns in describing the god, and in the arrangement of the lines. The interesting comparison with a private hymn to Amūn of the Nineteenth Dynasty is pointed out in the chapter on the demotic inscriptions (XIX).

Come unto me, Osorbūkhe, my great lord !
O mayest thou live millions of years. Mayest thou enjoy the duration of the sun !
I am thy servant, my great lord.

[1] As described by the earliest travellers, the lake had four flights of steps leading down to it, similar to that portrayed on some of the Buchis offering tables.

I cry unto thee, tireless of calling.
Manifold are my callings by night and my wanderings by day ;
Care is heavy upon me,
I am so little against them all.

I cry unto thee, tireless of calling.
(Weary not of calling unto God,
Has he his time of death when he will not hearken ?)
I call unto thee and thou hearest what I say.

If we call, thou hearkenest. Come unto me, O Lord !
O mayest thou live millions of years and mayest thou cause joy in the lands throughout eternity
For all male beings.

Despite such evidence of private devotions to Buchis, it must be admitted on account of their scarcity that this god does not appear to have held an intimate place in the heart of the ordinary man. If the evidence began earlier, this might be taken as evidence of Buchis not being a local god, for it was the original local gods to whom the people remained constant ; but at the late date when the Bucheum began it would be dangerous to draw any conclusions. It is possible that work in the Armant temple area may show that such devotion was paid there ; or the original burial place, if it exists, may be comparable with the Serapeum in this respect.

In life the bull wore a crown, similar to, but probably more durable and larger than, that worn in death. It is likely that the disk and the framework of the feathers were made of sheet gold, instead of gilt wood, and that the inlay of the feathers was of lapis lazuli instead of glass. Possibly he also wore a net of some sort, derived from a method of keeping off the flies. His processions, as we have seen from the descriptions of the ceremonial progress to Armant after the installation ceremony at Thebes, were splendid affairs, with priests, musicians and a large retinue in attendance and were accompanied by much rejoicing—at least of an official nature.

An interesting question arises from the apparent celibacy of Buchis. There is no direct evidence that he had any mate, yet there is a serious objection on religious grounds to his being without.

There is plentiful evidence to show that when a people sees the fertility principle incarnate in a man, usually the king, it is always supposed to be passed on to the people and lands by use and not by conservation. So much was this so that in many tribes the signal for the king's death and replacement was his inability to satisfy the sexual desires of his many wives. (See Sir J. G. Frazer, *The Golden Bough*, abridged edition, pp. 264–283.) The same principle of exercising rather than guarding the fertility principle is shown by the worship of Aphrodite. (Frazer, *op. cit.*, pp. 335–341.) Admittedly the Egyptians were very sophisticated by the time the records of Buchis begin, but it would be strange if Buchis, the emblem of fertility, were to be celibate, an idea totally foreign to Egyptian religion and to all Egyptian thought. That the conception of Apis as a god who brought fertility to the fields had not died in historic times is shown by a passage of Eusebius, *Præparatio Evangelica* II, 1, 47b, 2f. to the effect that the Egyptians worshipped Apis and Mnevis because bulls " had helped the discoverers of the corn crop in their sowing and the routine of farming." See also Diodorus I, 21, 11 and I, 88, 4. The first direction in which we look for some evidence of a mate is with the sacred cows, especially the cow Hesat, of Aphroditopolis, but there is absolutely no trace of this from either site and the

supposition cannot be supported.[1] In the spiritual world there are suggestions of Hathor being the mate of Buchis, but this does not help us.

The two most serious questions, if we suppose Buchis to have been mated, are the disposal of the cows and the calves. The only cow burials in the neighbourhood of the Bucheum are those of the *mother* of Buchis. By analogy with the king, who was divine, there would be no objection to Buchis being married to his mother, if it were not that she was probably regarded as a virgin. There is strong evidence from classical sources that Apis's mother was so regarded both at the time of the birth of Apis and subsequently. Mariette summarises this on p. 20 of his *Mémoire sur la mère d'Apis* (Paris, 1856). He accepts the evidence of the classical authors, and on p. 53 he says that Apis was the image of Osiris himself, but also the second life of Ptah, the son of Ptah. The mother of Apis was impregnated by Ptah in the form of celestial fire from heaven. Mariette, on p. 10 of the same work, discusses the two theories held in classical times about the marriage of Apis : " Les épouses d'Apis nous sont connues. Élien parle des appartements dans lesquels étaient enfermées, pour l'usage d'Apis, les génisses choisies parmi les plus belles de l'Égypte. (Ælian, *Hist. anim.*, I. XI. 10.) Mais ce fait que Élien seul mentionne, ne parait pas certain. " *Sed videtur*, dit Jablonski, *hoc Ælianus ex ingenio suo ut enarrationem coeptam ornaret, confinxisse*' (*Panthéon*, IV. 2, p. 187). Pline, Ammien Marcellin, et Solin sont plus dans le vrai quand ils nous apprennent que tous les ans on présentait à Apis une vache pourvue de certaines marques sacrées, et que le même jour on mettait cette vache à mort. (Pliny, *N.H.* VIII, 186. Solinus 32, 20. Ammianus Marcellinus XXII, 14, 7.) L'étrangeté même du fait est pour nous une garantie de la véracité de ceux qui nous le fait connaître. Élien, entraîné par les besoins de son récit, et vantant la splendeur du temple d'Apis, a tout naturellement supposé au dieu des épouses nombreuses et dignes de lui. Pline, au contraire, a dû ne nous transmettre que le mention d'un usage certain, précisément parce qu'un usage de cette sorte ne s'invente pas. D'ailleurs n'est-ce pas là une question de dogme ? Apis, dieu fils lui-même, avait-il le droit de procréer d'autres dieux ? Pouvait-il donner le jour à d'autres animaux de son espèce qui, fils d'un Apis, auraient pu ne pas être des Apis eux-mêmes, c'est-à-dire des taureaux revêtus des empreintes divines ? Autant ces considérations rendent impossible la mention d'Élien, autant elles donnent de poids au témoignage des autres historiens que nous avons cités. Apis avait donc une épouse, ou plutôt on lui présentait une génisse tous les ans ; mais elle était aussitot après mise à mort, parce que les lois de l'Égypte ne voulaient par qu'Apis se perpetuât lui-même. Quant aux monuments . . . elles se refusent à nous livrer la moindre mention des épouses d'Apis. On trouve bien, au chapitre 148 du Rituel, le taureau mystique et les sept vaches ses compagnes ; on trouve aussi sur l'obélisque Barberini, sculpté par Adrien pour être placé en avant du tombeau d'Antinoüs, une inscription dans la-quelle, à propos de l'Égypte, on dit  *ses quatres taureaux avec leurs femelles*[2] (G. Zoega, *de usu et orig. obeliscorum*, Roma, 1797, L. M. Ungarelli, *Interpretatio obeliscorum urbis*, Roma, 1842, planches). Mais, dans le premier cas, il s'agit d'animaux purement imaginaires ; dans le second, nous ne savons si Apis est un des quatres taureaux cités, et si, d'un autre côté la recherche du style

[1] The Apis bull of Ptolemy VI was born in the Temple at Memphis, which makes it appear as if his mother were predestined for the purpose.

[2] Although it is difficult to ascertain the true meaning of this passage without reference to its context, it seems probable that these are not any of the incarnate bulls of Egypt, but that we have here a reference to the four male and four female members of the Ogdoad. (See further ; K. Sethe, *Amun*, §173–176, especially §176.)

propre à l'époque à laquelle le monument appartient ne nous autorise pas à voir dans la groupe  le sens général de vache, plutôt que celui plus précis d'épouse. Les sept vaches de Rituel ne prouvent donc rien de plus que les quatres vaches, de l'obelisque Barberini, puisque les unes ne sont certainement pas celles dont les adorateurs d'Apis faisaient suivre à dieu, et que les autres, en supposant même qu'elles ne fussent pas des vaches mères, peuvent tout aussi bien avoir été des épouses de taureaux parmi lesquels Apis n'était pas compté. On peut donc considérer les monuments comme muets sur la question qui nous occupe."

Mariette's reason for accepting the version of the classical authors other than Ælian (on account of the difficulties if calves were born) is sound ; but Mariette did not concern himself with the cemeteries of the cows, so he does not point out that this explanation also solves the problem of the disposal of the wives. If Apis and Buchis were not wived, but occasionally provided with a heifer, to be slain immediately, this heifer would carry no special sanctity, her status being less than that of concubinage, and after sacrifice might well be eaten by the priests without further ado. There is only one objection to accepting the story of the classical authors, and that is that such a functioning on the part of the bull, though more credible than celibacy, hardly agrees with what would be expected of a fertility god. Action as a stud bull would be an extremely probable activity (and Buchis's travels strongly favour such a theory), but, there being no other evidence, we must accept the classical account for Apis and apply it to Buchis also.

For the end Buchis suffered we are again without evidence. There was neither regularity in his length of life nor in his reign. Five bulls, those of Ptolemy IX and XI, Augustus (the first bull), Tiberius and of Commodus (?), lived twenty-four years and an odd number of months and days ; two, of Ptolemy IV and VII, lived eighteen years odd ; three, those of Ptolemy VI, and the second of Augustus, lived seventeen years odd ; the average life, excluding the second bull of Antoninus Pius, which obviously died prematurely, was twenty years, three months, twenty-four days. Whether a limit of twenty-five or twenty-eight years was set upon the life of the bull does not enter into the question, as no bull lived so long. The obvious inference from the figures is that, at this late period at least, the bull was allowed to die a natural death. It is still possible that the bull was killed upon the first signs of illness or approaching senility, but, if the latter, a very liberal interpretation must have been put upon what counted as youthful virility. In no case would the bull have been killed to make way for a new one born with suitable markings, as in every case the birth of a new bull is subsequent to the death of his predecessor. Possibly, however, the date of the birth of the new bull was falsified.

Information is more plentiful about the death of the bull than about his life. For the ceremonies concerned with the bull's mummification and transport to the Bucheum *The Apis Papyrus*[1] is the best guide. Here is given a brief description of the ceremonies, as well as a description of the actual embalming of Apis. The section quoted here from Pl. XIII is an English version of Spiegelberg's translation of the document, and must be regarded as provisional :

" They must complete another shrine and equip it with red linen. Two priests of this god must be equipped with a bandage of red linen. The priests clothed with *sšd* linen must enter

[1] Demot. Pap. Wien, No. 27. Published in facsimile in *Hieratische und hieratisch-demotische Texte der Sammlung ägyptischer Altertümer des Allerhöchsten Kaiserhauses*, Bergman, Wien, 1886, and translated by W. Spiegelberg in *A.Z.*, LVI, p. 1, as *Ein Bruchstück des Bestattungsrituals der Apisstiere*. Referred to throughout this book as *The Apis Papyrus*.

the shrine which is equipped with red linen, and they equipped with red linen must enter the shrine which is equipped with *sšd* linen.

" Then must they bear the resting-bed which was under the god. They must cut themselves and bring the . . . They must found a . . . and bring it to the place where the shrine of the god stands. They must make a length of stuff (over) the cypress-roof, which is by the King's door of the palace, which opens to the stall against the south wall of the place of the Apis bull, to the east wall of the *kbḥ* house. They must open the door on the east wall of the stall. From it, come they out as they found it in the 24th year of Pharaoh Amasis. From the (stone-built) door in the west wall of the stall, out of which he went in year 12 of Pharaoh Apries. They must enter to the god from the door of the stall, while the two priests stand behind him. They must put up an inscription on the west wall of the stall which is in the path.

" A kiosk must be made on the first day, on the bank of the sea of the King, after his grave has been fitted up with cloth. His amulets shall be according to the above described wrapping. They must clothe it first with cloth of 80 divine cubits as follows : 20 cubits in one place . . . 60 cubits at the four corners of the kiosk. To the west place must they first enter after he has gone out of the east place. They must bring the . . . into the chapel. They must bring the beginning of the cord with (their) hands to the coffin and draw it out. The priests must draw it herein. All people must raise a great lamentation and weep over the god of the great house. The priests must take the beginning of the cord out of the hand of (the Great Ones of the House ?) of the Nile God. They must enter the lake with Isis and Nepthys before him, with two vases of natron in their hands, ten *mnḥt* bandages (bandage of white cloth). The God Upwat of Upper Egypt, Upwat of Lower Egypt, Rē', Horus, Thoth, the Bed of Ptāh are before this god. They must make the god rest on a bed of sand so that his face is to the south. The priests, who entered the shrine, must go to the lake and go into the Papyrus Bark with the shrines. They must be steersmen. Then must they read nine papyrus rolls on the ship, namely :

(1) Instructions for the Journey of the First day ;
(2) Protection of the Nishmet Bark ;
(3) Protection of Buto ;
(4) The Plan of thy Face ;
(5) Glorification of the Drowned Osiris ;
(6) The Protection of the Bark ;
(7) The Driving off of Apep ;
(8) The Good Fortune ;
(9) The Opening of the Mouth ;

" They must go into the kiosk to the god and open his mouth, in the four places of the kiosk, absolutely alone. They must perform for him all the ceremonies which are in the festival ritual. They must make the god enter the Door of the Place of Embalming. This god must be led to the Door-house of the Horizon to the great Hall of the Place of Embalming. The (Great Ones of the House ?) of the Nile God must throw bricks before the coffin that he may not go into the Place of Embalming. The Lectors and Priests must draw him in. The Lector must take the shrines out of the hand of the priests who have them. They must make him rest in the tent. The Lector must loose the stuff of the coffin. The Ritualist must come out. He must cover and bedeck him. They must perform the Opening of the Mouth for him with all its things set out.

Then must the priests of the Lake and the Way (?) and the Ritualist collect all the things which they need in the dissecting room."

Of the mummification more is known. *The Apis Papyrus* gives an incomplete description and the text is corrupt, but some parts are described very fully. Where it has been possible to equate the evidence from excavation at the Bucheum with the written description there has been a very close tally between the two.

The second method of Herodotus was used in mummification, *per anum*, and a complete set of the implements used in this process was found in the Bucheum.

The bull was bandaged very elaborately, and was later attached to a wooden board by bandages running through clamps fixed into the wood. The head was plastered and the plaster was covered in gold leaf. A replica of the crown worn in life, possibly on a smaller scale, was attached between the horns. This replica was made of wood and covered in gold leaf, while the quills of the feathers were reproduced in blue glass. Eyes were fastened in, probably before the plastering stage. At first the eyes were made of carved stone and set in a bronze holder, later of glass in a bronze holder, and finally altogether of glass. The finest examples were made in separate pieces of differently coloured glass. Eventually the eye was no more than a piece of clear glass with a smear of black paint for the pupil. It is likely that for those mummies which had no artificial eyes the eyes were painted on the linen. The best idea of the bull's appearance at this stage can be gathered from Plate VII.

It seems probable that in the case of the monolithic sarcophagi the mummy was put into the sarcophagus before the latter was lowered into the tomb, but that in the polylithic examples the opposite was the case.

In the time of Nekhthorheb the funeral chamber and furnishings were on a much larger and more magnificent scale than they were later. For the bull of Nekhthorheb there was a granite sarcophagus in a stone-lined chamber and beside it an adobe vault for offerings. Later the tombs were all cut in the rock, and, though there was a forecourt, this was not used for offerings, but only contained the ramp down which the sarcophagus was slid into the tomb. In the period immediately following Nekhthorheb (the reigns of Ochus, Arses, Alexander the Great and Alexander IV) two bulls were buried, and these had no sarcophagi. Afterwards monolithic sarcophagi were again used, but these were sandstone. A rapid decline took place in the middle of the reign of Ptolemy V and polylithic sarcophagi of a very poor type were used. About the middle of the reign of Tiberius a renaissance took place, and a well-cut form of sarcophagus was installed and lasted until the reign of Caracalla. At this date sarcophagi ceased. The last two bulls were buried in the passage, the antepenultimate being buried in the offering vault to burial 10, that of Nekhthorheb.

In all burials, except that of Nekhthorheb, offerings and furniture were scarce. For that burial there was a *nms.t* jar inscribed to Buchis for the king, a small inscribed bronze bottle, a bronze *kbḥ*, a gilt wooden ibis on sled and a jackal in painted wood. The latter may have stood on a chest similar to the pottery jackals in the Serapeum. In addition there were, no doubt, the usual offerings of lamps and incense, a granite offering table, and there was, of course, the official stela.

Each stela was placed leaning against the blocking of its tomb, and rested on a stone slab. There was undoubtedly one for each tomb in the Bucheum. They recorded the chief events of

the bull's life (his birth, installation and death), usually gave his length of life, always expressed pious convictions of the glory of his life in the afterworld, and very occasionally recorded some other happening in his life. Fairman has classified the bull stelæ into five classes by their formulæ: Early Ptolemaic, from Nekhthorheb to Ptolemy V; Middle Ptolemaic, two stelæ of Ptolemy VI; Late Ptolemaic, from Ptolemy VII to Ptolemy XI; Early Roman, from Augustus to Tiberius (there is a big gap here and the intervening stelæ may have belonged to this or the next group); and Late Roman, from Domitian to Diocletian.

The offering tables could not be dated by classification either from the inscriptions or the designs. A priest whose name was found on one of these tables was identified as the owner of a cartonnage robbed from the 400 cemetery[1] and now in the British Museum (No. 6969). That the tables were used after the burial of the bull can be inferred from evidence provided by the demotic ostraka. In the accounts section there is the payment of a saltwater pourer, who may be presumed to have made offerings of this strange beverage to the dead bulls; and there were also two consignments of myrrh, natron and incense to the Bucheum at a date when it was not possible for a burial to have taken place. The myrrh and incense would have been offered in the burners and lamps made for the purpose, but the natron and salt water would both have been poured on to the tables. The tall lamps which were found outside the tombs may have been for offerings or purely for illumination. It is probable that at least on certain occasions the passages of the Bucheum like those of the Serapeum were open to the public, and then the lamps would have been needed to light up both the stela and the place for offerings. There were also edible offerings which after being formally offered to the bull became the property of the priests and were eaten by them. Part of the priestly revenue was composed of such perquisites.

It is difficult to estimate the numbers of the Bucheum staff of priests and others. The demotic accounts mention twenty or more officials, but they appear to be those of the temple in which Buchis lived rather than of the Bucheum. There were not sufficient superstructures at the Bucheum for the use of twenty officials. On the other hand the name of the chief priest was Petosorbukhe, which is more likely to be that of the chief priest of the Bucheum than of any temple in Armant. It is interesting to note that, according to E. R. Bevan (*History of Egypt, The Ptolemaic Dynasty*, p. 136, n. 1), in 99 B.C. one Petesis was embalmer both for Apis and Mnevis. The embalmer at the Bucheum does not seem to have been employed for any other animal, but there can be little doubt that the embalmers worked on behalf of private individuals when not occupied with the burial of a bull. In Vol. II, p. 27, a Greek mummy ticket is quoted which reads as follows: " To Hermonthis. Thaësis, daughter of Senthoteutes, for delivery by her son-in-law Pikos to Pseneoneris, grave-digger, with a notification at the Bucheum to Pseneoneris, pastophorus of the divine animal Buchis, that he has paid the freightage and tax and all expenses. Khoiak 26." This body, however, was already mummified, and the services of the Bucheum sexton alone were required.

The priest, Ahmes son of Smendes, whose statue is illustrated on Pl. CX, Fig. 1, was probably one of the earliest, if not the first priest of the Bucheum. We found no traces of the dwelling houses of the priests except the remains of a very insignificant structure within the temenos wall. The superstructures of the Bucheum were also negligible and it seems probable that all the priestly offices were performed at the Temple in Armant and that there was little more than a

[1] Published in *J.E.A.*, XVII. pp. 223 ff., pl. XLII ff.

guard at the Bucheum. There are remains of what may possibly have been priests' dwellings in the Baqaria Roman village. The priests were buried, at least during the later Ptolemaic period, in cemetery 400, which lies to the South-West of the Bucheum, close to the temenos walls. The cemetery has been badly robbed but one or two unplundered graves were found in the season 1929–30. Cartonnages from the robbed tombs are to be seen in various museums. The excavation in this cemetery was published in *J.E.A.*, XVII, pp. 223–232, Pls. XXXIX–LXVII, together with the British Museum cartonnages. The priests were buried with their relatives in family vaults. Pottery coffins were used and each mummy was covered with a painted cartonnage. Only one of those which we have traced, No. 6969 in the British Museum, gives the title of a priest of Buchis. Those excavated were either too destroyed for anything to be deciphered, or the section of the inscription giving the name and title were missing. The relevant portion of No. 6969 reads : " Utterance : O Osiris, embalmer of the Osiris Buchis, *W ḥ-ib-r*, justified, there comes to thee Anubis, *Imi-wt*, Lord of Ta-djeser, that he may give thee a goodly burial on the West of Thebes." The priest here named is mentioned on an offering table (Inscription No. 37) from the Baqaria. The cartonnage can be dated to about 60 B.C. Plate CXA shows the cartonnage from tomb 403.

In the later Roman period there was a steady decline in the Bucheum, similar to that which was taking place in most of the arts and customs of ancient Egypt. There is some evidence to show that at this date the mother of Buchis began to assume greater importance relatively to Buchis than she had previously held. The only inscribed cow stela occurs in the reign of Commodus. Throughout the Roman period the cows were buried in well-built, burnt-brick vaults, but this may have been due solely to the difference between the rock at the two sites. The first tombs of the Baqaria were two cow burials in large adobe vaults, each having a sandstone sarcophagus, whereas the second burial in the Bucheum had no sarcophagus. This is accounted for if the mother of the bull of Alexander the Great died during the time of Nekhthorheb and a tomb was then built for her similar to that of her predecessor.

The earlier burials in the Baqaria were generally poorer than those of the Bucheum. The mother of the bull of Nekhthorheb had an adobe vault and not a stone one like her son's ; neither had she an offering vault. The Ptolemaic burials had no sarcophagi and the bulls were buried in poor rock-cut chambers of irregular size. Offering tables were found in the Baqaria and lamps similar to those of the Bucheum. There were no stelæ with the exception of that of Commodus mentioned above, and an engraved but uninscribed one of Diocletian from the separate burial outside the Baqaria. Throughout its history the Bucheum suffered from collapses of the roof and walls, both of the tombs and passages, and the Baqaria was not immune from these calamities. The fault lay partly with the rock, which in neither site was of the right nature for such a mausoleum, but partly also with the priests, who, except in the first few burials, never left sufficient space between the tombs. Various attempts to repair the damage were made in the Ptolemaic period, when mud-brick walls and buttresses were put up in different parts of the two buildings, but this was done in a casual, slipshod manner. In the Roman period a genuine effort was made to deal with the trouble. In the Bucheum strong burnt-brick walls and buttresses were erected in the south passage, and two tombs, which had collapsed badly, G and H, were walled off. In the Baqaria still more efficient repairs were undertaken and a burnt-brick vault was made throughout the length of the North and South passages—with the exception of the extreme ends. Towards the end of the period of occupation all attempts to dig new tombs or to keep the passages open were abandoned and mummies were placed in the passages of both places.

The close of the history of the site is elusive. The bull of Diocletian was buried in the Bucheum with an official stela—the latest hieroglyphic stela in existence—and his mother was buried as described above. There are two other uninscribed stelæ with engravings of a cow full-face which were sold as being from Armant. It is quite possible that, if the successor to the bull of Diocletian was destroyed his mother would have been buried in the correct manner earlier, but it is altogether surprising that the cult should have come to an end at such an early date. The Serapeum was not destroyed until the reign of Theodosius I, and it is generally believed that the pagan religions survived longer in Upper than in Lower Egypt. On the other hand, Christianity had a tremendous centre in the Thebaid, and it is possible that the adherents of Buchis became so few that the cult was given up—went, so to speak, into voluntary liquidation. Whatever the reality of the end may have been, it is on Hathor 6 (Nov. 3rd) in A.D. 295 that we have our last glimpse of activity in the Bucheum, after an occupation of more than 650 years. Short though this period is in comparison with the history of the Serapeum, yet it is as long as that of most of our cathedrals ; and the Bucheum might have survived the decadence through which it was passing in the Late Roman period, as it survived the decadence of the Late Ptolemaic period, but for a more powerful enemy than the corruptness of its own supporters. Together with the rest of the native religion it fell beneath the spread of Christianity, and the effect of this change upon the civilization and character of the Egyptians has been both deep and lasting.

O. H. M.

CHAPTER II

THE SITE

THE Society's concession lies in the desert between the west bank of the Nile and the cliffs of the plateau, and extends from Ḍab'iya to Er Rizeikat, a length of about fourteen kilometres. In this area the Nile runs east and then north-east before cutting due north again at Luxor. The cliffs lie back some four to six kilometres from the cultivation edge, and the intervening Low Desert is cut by several *wadi* beds, and further broken up for a third of its width by spurs thirty to fifty feet high, which jut out from the base of the cliffs.

At present work has been undertaken only in the desert area, and this volume deals with the Bucheum, the Baqaria (or burial place of the mothers of Buchis), a small Roman village attached to the Baqaria, and a stone enclosure on the Nag' Ḥamâdi road, about a kilometre and a half to the north-west of the Bucheum.

Some of the cemeteries (100–500 and 700–900), mostly of Roman date, in the neighbourhood of the Bucheum were published in *J.E.A.*, Vol. XVII., pp. 223–232, and Pls. XXXIX–LXXVII.

The most important site for excavation in the concession, on which it is hoped to begin work in the near future, is in the town of Armant itself. Unfortunately, we cannot excavate according to the importance of the site or the convenience of publication, but must first attack those places which seem to be most in need of rescue from the depredations of the tomb robbers. An enormously high proportion of the goods provided for tourists by the licensed " fences " of antiquities in Luxor are the result of the spoliation of acres of important cemeteries near Armant.

Throughout ancient times Armant was one of the most important centres of Egypt. Originally the town was called  , *'Iwny*, which in the Eighteenth Dynasty was changed to  , *'Iwnw-šmᶜ* " The Upper Egyptian On," in order to distinguish it from *'Iwnw*, " The Lower Egyptian On " (or Heliopolis). In Ptolemaic times the name  , *'Iwnw-Mnṯw*, " Mentu's Heliopolis " appears, from which was derived[1] the Coptic ⲉⲣⲙⲟⲩⲛⲧ and the Greek *'ερμωνθις* " Hermonthis," and in the early Arabic period its present name of Armant.[2] Judging from the neighbouring cemeteries, it seems probable that its rise to importance began in the protodynastic period. It is thought by some to have been the home of the Eleventh Dynasty kings[3] and was certainly a centre of activity during that dynasty. Later, as the home of the war god, Mentu, though somewhat overshadowed by the pre-eminence of Thebes, it declined little in importance, and was one of the places of coronation of the king. Akhenaten built a temple there, Rameses II erected two colossi and Nekhthorheb built a temple. The Ptolemies paid it great attention, and Kleopatra erected the Mammisi so much admired by European travellers The Romans built there, ruling it as the capital of the nome, and during the Byzantine or Coptic

[1] See Lacau *Receuil Champollion*, 727–729.

[2] ارمنت So Ibn Batutah, *Travels in Asia and Africa*, 1325–1354.

[3] But see Winlock, *A.J.S.L.*, XXXII, Oct. 1915, 1ff.

period it was one of the most important administrative and religious centres of Upper Egypt.

According to J. M. Wansleben (*The Present State of Egypt, etc. in 1672 and 1673*, London, 1678, pp. 243, 244), the Arabs held a tradition that Armant was the birthplace of Moses.

Many of the monuments of the town's departed splendour, though in ruins, remained until the beginning of last century, when the work of demolition began.

Nestor L'Hôte, writing in 1840 (*Lettres ecrites d'Égypte*, Paris, 1840, p. 104), describes how the great Christian church of Armant, built from the materials and on the foundations of earlier temples, had been destroyed ruthlessly in order to build " les poudrières du Pacha." Until this time the Mammisi, or small temple, built by Kleopatra in honour of the birth of Cæsarion, was still standing. G. Ebers (*Egypt* : Translation into French 1881, p. 338) says that beyond a few ancient columns and blocks of stone, there is now little to be seen of the temple of Mentu, the sun and war god, with the Mammisi by the side of it. He continues : " Il y a environ dix-huit ans de cela, un entrepreneur grossier a démoli le sanctuaire, et a enfoui les blocs richement ouvragés dans les fondations et dans les murs de la grande raffinerie vice-royale." Until another step on the road to perfection provides us with a synthetic substitute for cane sugar, there seems little hope of restoring the Mammisi. Meanwhile, however, Baly has collected from the records of medieval and later travellers all the available information about Armant before its destruction, and we are now reasonably certain of the plan of the Mammisi and of the positions of most of the reliefs on the walls. It is also possible to reconstruct the plan of the church, which, according to Butler (*Ancient Coptic Churches, etc.*, Oxford, 1895, I, 358), " must have been extremely fine, for it has the advantage over the Red and White Monasteries in being a double-aisled basilica." Such information will be invaluable when attempting to reconstruct the site from the remaining fragments and from anything that we may subsequently be able to recover. Moreover, exasperating as it is to read of the destruction of the temples, which were admired by so many travellers from the time of Wansleben until 1840, these can be but a tithe of what remains to be found in the *tell* of Armant. It is probable that a colossus of Rameses II is still standing intact, upright in the accumulated rubbish, and the remains of the Middle Kingdom structures have not been tapped by the apostles of progress. There are, moreover, all the remains of the superimposed towns to be investigated. Though these have no doubt been disturbed by inhabitants of the present town, much of importance must still remain. The temple lake may yet hold a cache of statues and other valuables from the temples of all periods.

Thus, despite the appalling destruction which has taken place, Armant will probably prove to be the most important untouched town site in Egypt—and, apart from all such considerations, who could resist excavating the town which, according to Abu Saleh (*Churches and Monasteries of Egypt*, fol. 102), was founded by Busim the King, son of Caphtorim, son of Baisur, son of Ham, son of Noah ?

The large number of monastic remains in the desert provides ample proof that Hermonthis was a great centre of Coptic activity. There are more than a dozen ruins of dwellings of hermits and of monks, amongst them three monasteries of considerable size and importance : the Deir of St. John among the cliffs to the north of the house (which we are preparing to excavate as this goes to press), and the Deir en Nâmûs and the Deir el Abyad in the desert to the west. The Deir el Abyad is very large and forms a *tell* twenty or thirty feet high. From it the natives recently removed a granite altar about a metre long by half a metre wide and weighing over a ton. It

would not be surprising to find that this monastery is among the most important buildings of this date in Egypt. It was in one of the monasteries of the Thebaid, possibly one of those in the cliffs behind Armant, that Athanasius hid from Constantius II.

There are predynastic settlements on the concession of which one (marked on the map as 1000 and 1100) has been excavated and will be included in *Cemeteries of Armant I*. Others, as yet untouched, look still more promising.

The cemeteries are numerous and large, and every period is represented. There is a large cemetery of the Græco-Roman period stretching to the west of the Bucheum for a distance of a kilometre, which was almost certainly the cemetery for those who wished to be buried near Buchis, and in the Strasbourg Museum there is a mummy ticket inscribed in demotic, Vol. II, p. 27, Pl. CIX, Fig. 4, belonging to a body sent from Thebes for burial near the Bucheum. This cemetery was popular during the Byzantine dominance, and is used by Copts to this very day.

The cemeteries of the greatest importance are those of the early Middle Kingdom. They are situated for the most part near er Rizeikat, where they cover an area of a square kilometre or more. Many of the tombs are of imposing dimensions. For years Luxor dealers in antiquities have been supplied with carnelian and amethyst beads and much else of interest from this site. Nevertheless, there is no doubt that the robbed tombs will provide a wealth of information about this difficult period when they can be excavated, and there are a number not yet opened by modern robbers.

The Old Kingdom is represented by some large shaft tombs, unfortunately badly plundered, which have not yet been explored.

The protodynastic cemeteries are important, and two graves of exceptional interest, numbered 1207 and 1208, have been excavated and will appear in the later publication.

A predynastic cemetery (1400–1500), representing the range of that period, was excavated in 1932 and will also appear later.

It is not possible to include here a catalogue of all the sites of interest and promise on the concession, but two curious features deserve mention : one is the belt of sand which pours over the cliffs, marches in dunes across the Low Desert and finally forms a barren strip in the cultivation, reaching down to the Asfûn canal ; the other is a strip of desert, four kilometres long and 250 metres wide, which has been swept bare of stones and boulders.

In *Description de l'Égypte*, Paris, 1826, Atlas Géographique, F^lle^ 5, ruins are marked in the strip of sand, but no traces of these are visible to-day, and there is no tradition of such remains among the people who inhabit the neighbourhood.

The strip of desert can be seen in the north-east quarter of the aerial survey on Pl. IX, and in detail on p. 5 of Pl. X, stretching from the foot of the cliffs to a high knoll in the Low Desert. Ending in two slopes which are bare of any remains, its purpose is obscure, but it may possibly have been a chariot race-course, the knoll in the Low Desert representing the grand stand. Sir Robert Mond suggests that it may have been the road leading to an important tomb.

The map on Pl. III is the second sheet of our own survey of the concession which Shaw is making at a scale of 1/10,000. Many of the places mentioned above can be seen on this map and, in addition, the relative positions of the four excavations which are dealt with in this volume are clearly shown, together with Bucheum House, the headquarters of the expedition. The end of the winding *qisr*[1] from Armant should be noticed. The Bucheum and the Baqaria lie east and

[1] *Qisr* :—A roadway on a raised embankment which stands above flood level. Those which wind are old, the winding being due to constant erosion and repair.

west of a large wadi bed. It will be seen that the temenos is eroded away on the south side, where no traces of it could be found. Similarly, it was not possible to trace any road up to the Bucheum from the cultivation, though a stone sphinx was found in the middle of Settlement 1000. The road may originally have led straight across the desert from the *qisr* at 1300, but no traces were visible and, considering the irregularity of the ground, this does not seem a very likely course. No connecting road between the Bucheum and the Baqaria could be traced, and the reason for their respective positions is not clear. It is not certain whether the early burials were intended to face west or local south, and the plan of the Serapeum is of no assistance in this matter. In the cemeteries of the neighbourhood the orientation is very erratic, which shows that there was confusion in the minds of those responsible for the burials.

O. H. M.

CHAPTER III

ARCHITECTURE

THE dating, or at least the sequence dating, of a series of superimposed buildings is a fairly simple matter, but the dating of separate periods of building in an underground construction is an extremely difficult task and almost impossible when there is but little interval between the different periods. Such is the case in the Bucheum and in the Baqaria ; and though the sequence is certain in a number of cases, and the actual dates of some of the constructions can be suggested, it is impossible to establish a complete chronological order. It is obvious that, when working underground, only rarely will superimposition take place. Later walls may bear any relationship to earlier ones, being in front of, to one side, interlaced or even at a lower level. Two circumstances make the work doubly difficult in the Bucheum. One is the poor nature of the soil, which caused frequent collapses and necessitated many underpinnings, and the other is the slipshod way in which such repairs had been done, odd bricks often being inserted here and there to fill cracks. The general collapses were much increased by the habit of digging the tombs too close together.

The table on pp. 50–52 gives full details of brick bonds and brick sizes and these will not be given here except where they are necessary for a train of argument. For a full discussion of the brick sizes, etc., see the chapter dealing with building materials on p. 47. Pls. CXII–CXIV give the corpus of brick bonds and no individual references to these plates are given in the text. Pls. XII–XIX contain the series of architectural photographs, and these are referred to throughout the text. The figures have been arranged, however, as far as possible in the same order as the text, so as to facilitate reference. The superstructures are an exception, since the photographs of these are at the beginning of the plate series, whereas they are treated last in the text.

The plan and elevations of the Bucheum are on Pls. III and CLXXII respectively, and no reference is made to them in the text, as by the method of binding employed it is possible to have them open at the same time as the text and plates. The photograph of the model of the Bucheum[1] on Pl. VIII is inserted to give the reader a three-dimensional impression which it is often difficult to obtain from plans, elevations and photographs of small sections. The model represents a partial reconstruction of the Bucheum as it was in the late Roman period. The rock has been cut away in an arbitrary manner to expose the tombs. At the time when the model was made burials G and H were not yet excavated. For measurements the plans and not the model should be examined.

The order adopted, both in the table and the text, begins with the passages, the West or

[1] This model was made by Mr. Thorpe and is on view at the Wellcome Historical Medical Museum, to which institution much of the material from Armant was presented so that a representative selection should be on view in London where those who are interested can gain ready access to it.

entrance passage, then the North passage and the South passage ; the construction of the tombs follows, and finally come the superstructures.

At the top of the West passage there are three superimposed pavements, the lowest of which dates to a period near the beginning of the Bucheum (Pl. XIII, Fig. 1).[1] Pl. XII, Fig. 3 shows the relationships of the three pavements, and Fig. 4 the relationship of the pavements to one of the mastabas and to the level of the native soil. It will be seen that all the constructions stand considerably above this. This may mean no more than that when the passage was excavated a quantity of the waste was thrown intentionally or unintentionally close to the entrance.

The passage was walled at the sides, but open to the sky as far as the lintel (Pl. XIII, Fig. 4). The same plate, Fig. 2, shows the back of the walling on the north of the lintel. It will be seen that the rock was cut back considerably and that a wing wall was thrown out from the lintel. The extra width was probably to enable the builders to construct a vault over the passage at this point. The cutting back went further than required, or was perhaps conceived to be necessary in connection with the placing of the lintel. A mud vault continued from here to where there were two stone buttresses. It appears that a vault would be necessary here, as there was insufficient thickness of rock between the top of the passage and the surface for it to be possible to leave a roof unsupported. The actual remains of the vault found by us, however, were late in date, as the arch was sprung on burnt bricks. It is possible, therefore, that the roof supported itself for some time and that the rock was cut back and the vault installed at a later date. If so, the lintel is also late or was reinserted. The most likely explanation is that an earlier vault fell in and was replaced. In favour of this hypothesis we have the fact that part of the North wall exhibited repairs. The wall had split in half vertically and the whole inner face had fallen away. The subsequent repairs with a different size of brick produced the curious bond R 2 a (Pl. CXIII). The bottom bricks of the arch, not being shaped, were tipped up on pebbles and sherds and weighted on top at the back with rough lumps of brick and mud plaster. One side of each brick was ribbed to take the plaster better. Each course of the arch leans back towards the east and the arch below must have been built from the lower part of the passage upwards.

Below the two stone buttresses, for a distance of about nine metres, the passage was lined with a burnt-brick wall or possibly vault, but we found only a few bricks of this. This was probably a late addition, but may be of the same date as the later vault described above.

From here to tomb 7 the passage was cut in the rock and no support was found necessary (Pl. XIII, Fig. 5). It is nearly certain that the whole of the rest of the passages originally had no walling and that all the wallings found are subsequent to the date of excavation and were either built to repair the structure after a collapse or erected to forestall such an event.

After 7, on the south, and at the beginning of 6 on the north, the wall was lined with brickwork, on the south with burnt brick only, and on the north with two mud walls of different date and one burnt-brick wall. The various levels here can be clearly seen in Fig. 3 on Pl. XIII. The bottom level is the native rock and represents the floor before any walls were built. About 30 cm. above this floor can be seen a level of rubbish with an adobe wall built upon it ; 55 cm. above the rock this wall ends and there is another floor-level where a further adobe wall was built nearer to the original sides of the passage. The burnt wall was built on top of the first wall and outside the second. It is possible that there was again another level of floor, belonging to the

[1] Some modern mud brickwork, put in by ourselves for protective purposes at an early stage of the excavations, is visible on top of the ancient construction ; it can be distinguished clearly by the size of the bricks and by its roughness.

last phase, but this is uncertain and the authors were not present when the passage was originally excavated. Repairs were later effected in parts of the latest burnt wall. The south wall shows no traces of earlier mud walls. If they ever existed, they would have rested on the rock ledge at 90 cm. and would have been cleared away when the burnt wall was built.

Turning up the North passage, the burnt-brick wall between the arch and the buttress on the west side varies in thickness from one and a half to three bricks. This is due to a rock-cut stairway, which runs down behind the wall. Pl. XIV, Fig. 1, shows the wall before removal, and Figs. 2 and 3 show the stairway. The holes are only robbers' tunnels. In the photograph it is noticeable that the stairway is cut slightly into the wall of the passage, the turnover being visible at the top. This is, however, not enough to give appreciable extra width. The explanation is almost certainly that this stairway existed before the North passage (and therefore before the South passage also), and that it originally was entirely enclosed like a tunnel. It follows that either the stairway was dug prior to all the tombs in the North passage or those tombs were not connected by a passage. When dealing with the superstructures evidence will be adduced for the stairway being made at a very early date, but it is also possible that some of the tombs were constructed separately. It may be counted as confirmation of the truth of the theories deduced from the staircase that the theory was put forward before the stairway was found. We had come to the conclusion that the entrance passage was of a later date than tomb 10, and probably later than several other tombs. If this were right, it seemed probable that there must have been at least one stairway down for priestly use. We made a search for it and it was found by reason of the varying distances of the rock from the wall as observed through the robbers' holes.

Fig. 4 of the same plate shows what was either a false door or a stela niche in the East wall, outside tomb 14.

This part of the passage was originally cut down from the top, but the bulk of the North passage was tunnelled out and, although wide, seems to have stood better than other parts of the Bucheum, as only a limited number of burnt-brick buttresses were installed. It is possible that it was cut down from above, opposite 18, but if so, more brick construction would be expected here. Pl. XV, Fig. 1, shows the remains of the brick buttresses which were insufficiently preserved to yield any details of bond. It will be seen that a considerable depth of debris had accumulated by the time they were built. Fig. 2 on the same plate shows the only remaining part of the original passage roof. The turnover can be seen just above the supporting board, $3\frac{1}{2}$ metres above floor-level. The passage ends in two walls, the southern burnt-brick and the northern adobe. The burnt wall had two niches, one at each side, possibly for stelæ, and in Pl. XV, Fig. 2, a boy can be seen sitting in the eastern niche. It appeared that this end of the passage was cut down from above and was probably used for lowering sarcophagi, or at least the sarcophagus for M. Figs. 3 and 4 of the same plate give further views of these walls.

Returning to where the West passage joins the South passage, Figs. 5 and 6 show two views of the southern face of the arch of the North passage. In Fig. 6 some restoration has been done by ourselves. The original burnt brick was supported on stone blocks at the base. There was no arch this side, but only buttresses supporting a rock roof, which were not bonded to and, presumably, were of a different date from the arch—which is bonded to the North passage walls.

The burnt-brick wall outside H, G and F was evidently built after a big collapse had taken place. The inside face of the wall shows the bricks to have been built blindly against the filling, the face being quite irregular. There seems to be no purpose in the small rough mud wall above

the burnt brick (see Fig. 6), unless built as a screen for workmen. The north end of the South passage was also cut down from above originally, probably to lower the sarcophagus for H.

In the next section, from outside F to the end of the South passage, there are six main stages discernible and a number of other minor repairs. Moreover, each of these stages was not, in all probability, a single construction, but was spread over a number of years. To illustrate these different stages a number of photographs was taken, in which certain features, almost entirely destroyed, are indicated by loose bricks.

Beginning with the latest stage, there were two burials, 19 and 20, in the passage outside G and H. A wall half a brick thick was built between them, but possibly not to any height, since only one course was found by us. The North passage was still open after these two burials were made. In the next stage the passage is still open from end to end, but it is much narrowed by red brick buttresses at various points, and the difficulty of differences of levels has been overcome by steps. Pl. XVI, Fig. 1, shows the upper end of the passage at this stage, Fig. 2 a view down the steps, and Figs. 3 and 4 views up the steps, Fig. 3 being taken before the rock was removed. Fig. 5 is looking down the lower end of the Bucheum. In this the pit S should be disregarded and the floor imagined as running continuously from the bottom of the stairway. Fig. 6 shows the extreme south end of the passage after the debris from a collapse of the roof had been cleared away. Pl. XVII, Fig. 3, shows the reason for the stairway. The passage roof had fallen in and buried an ancient mud-brick wall. It was evidently too difficult or dangerous to cut away the fall and a new passage was made over it. Fig. 4 shows how the burnt brick was put in to support the roof after a fall had taken place. A further and subsequent patching with mud brick was made here. That this is not the original roof is clear from the filling apparent under the rock in the bottom left-hand corner of the photograph. It was evidently cut after a fall previous to that which caused the building of the burnt-brick stairway, and this can be seen in the next stage.

This period of construction is illustrated on Pl. XVIII. Again S must be ignored. Figs. 1, 2, 3 and 4 show the remains of this period as it was found. Fig. 5 illustrates, by means of loose bricks, the amount of wall originally present as support.

The third period, chronologically, was when the passage was cut out of the rock and there were no wallings other than those at the entrance to tombs. The first figures on Pl. XIX show this, if S be again imagined filled in. The flat stones in the passage in front of the tombs show where the stelæ rested.

The second period is that in which S was originally dug for a Buchis tomb. It belongs to the early type of tomb, such as is found in H, 16 and 14, and may have been abandoned owing to water, but this is altogether uncertain.

The first period is that of tombs G and H, and in Fig. 5 of Pl. XIX the turn of the wall from the west of the passage is joined to the side of G, to which it originally extended, by a line of upright stones. Hence, seeing that there was originally no passage here, the western extension of the pavement of G is easily understood. The stone wall cutting across this at later stages belongs to a period when the passage had been begun.

From the absence of any brickwork in the bay 1–5, 23, it can be inferred, either that the bay stood up throughout the life of the Bucheum, or that it collapsed, and that it was not considered necessary to restore it. From the evidence of the sarcophagi it seems probable that this part of the Bucheum was Roman and therefore the former hypothesis is to be preferred.

Tomb 23 never contained a sarcophagus and it is probable that this was also so in 3, 4 and 5 (Pl. XXIV, Figs. 1 and 2).

No inference can be made from the lack of tomb blockings, owing to the quarrying which took place here, but the differently-shaped entrances in 1 and 2, from 3, 4, 5 and 23 should be noticed. Of 23 little was found. It was certainly subsequent to 6. At the end of 6 there is a curious cutting in the wall (Pl. XXIV, Fig. 3), the only explanation of which appears to be that the entrance from the West passage, afterwards blocked, represents the first attempt to dig a North bay, probably abandoned when the priests realised that tombs off this bay would strike Nos. 11–13 (cf. 35 in the Baqaria). This cutting is the normal preliminary to the method of quarrying known to have been used well into Roman times.

An unexplained feature of 7 and 8 (Pl. XXIV, Fig. 4) is the extension of the chamber behind 7 (7a), in which the stela and offering tables were found. Burial 9 (Pl. XIII, Fig. 6 and Pl. XXVII, Fig. 6) was a late burial and part of the offering vault of 10 was walled off and usurped for this purpose. The red-brick walls containing this were of a complex nature and apparently belonged to a variety of dates. The west, south and south-east walls were all one, and it is possible that the north-east fragment was built at the same time. When the passage wall was built, either the end of the north-east wall had fallen down or it was knocked down to make room for building the passage wall. In the passage wall it was clear that a doorway 70 cm. in width had been bricked up at some date. The cross-wall between the north and south sections of the complex at 9 was subsequent to any of the others. It is probable, therefore, that the vault which these walls presumably represent was prior in date to the burial and the cross-wall was put in when the bull was buried. A variation of the W1 a. bond occurred in the east wall here, but it was not preserved to a sufficient height for us to be certain that it represented a separate bond and not merely a variation at the base. It consisted of five courses of stretchers at the base, three courses of headers above this, then two alternate courses of stretchers and headers.

It is difficult to reconstruct the original state of 10, but at least there is no question that it was the finest, and little doubt that it was the earliest, burial in the Bucheum. The tomb chamber was built of stone, robbers having removed the vault (Pl. XXIV, Fig. 5). Fig. 6 of the same plate shows the rough chips of granite, from the dressing of the sarcophagus, which were used for the springing of the vault. It is difficult to see why the chamber was left open at both east and west ends and blocked up subsequently. Presumably it had to do with the lowering of the coffin, which, however, must have taken place more or less directly from above. So much alteration has taken place in the surrounding terrain since the burial that it is difficult to decide this, but mention will be made, when describing the superstructures, of a curious depression to the north of the burial ; the other side of the passage. Pl. XVIII, Fig. 6, shows the blocking at the east end of 10, and also a mud-brick wall built in front of it at an unknown date later than the burial. In Pl. XXIV, Fig. 5, what is apparently a stairway down the western blocking is visible. Attached to this burial was a mud-brick vault on the west which was almost certainly used as a vault for the funerary furniture and offerings (Pl. XIII, Figs. 6 and 7). It is now impossible to judge the original extent of this vault, but it was probably entered from the north from a passage originally connecting with the winding stairway, and later forming part of the West and North passages. From this came the fragment of the Nekhthorheb stela and, originally, also the *nms.t* jar, the *kbḥ* vase, the jackal head, the wooden ibis and various other objects. The presence of these objects in the dump-heaps of the Bucheum is explained by an

examination of the vault. On the plan an irregular white line runs through the vault. This represents the partition between old and new brickwork. The later brickwork was Roman in date, resting on a course of burnt brick. The later brickwork is A6 with interstices of 6 to 15 mm., whereas the earlier is A5 with no mortar. It is evident that when the interior of the earlier vault collapsed the funerary objects were buried, and when the restoration took place these were either thrown out accidentally, with the fallen rubbish, or disregarded as being " old rubbish " themselves—an attitude on the part of the workmen that would be natural.

Of burials 11–13, N and O (Pl. XXV, Figs. 1 and 2) there is little to remark. They were all roughly rectangular chambers with the doorways walled up with stone. In 11 there was but little space between the lid of the sarcophagus and the roof of the chamber. It seems probable that in the other examples, where the sarcophagus was completely sunk in the floor of the chamber, there was greater space between it and the roof. This would be necessary for its excavation.

Bucheum Q is not a burial, but the space behind the North walls, and has been referred to above.

M is noticeable for its length and for its irregularity. All the burials with the monolithic type of sarcophagus have a long chamber, and it is likely that the length between the front of the sarcophagus and the walling of the tomb was made for the same purpose as the adobe vault in 10. The stelæ were, however, placed outside in the passage. The purpose of the niches in the sides of this type of chamber is unknown, but they were probably connected with the installation of the sarcophagus. They are much clearer in other examples than in M. The fact that M curls round to the north shows that it was built subsequently to L, despite other evidence which appears to contradict this view.

L is even more roughly dug than M. From its type it appears that it was originally intended to hold a large monolithic sarcophagus, whereas when found it contained only a few blocks of stone. It might, therefore, be regarded as the intermediate stage between the normal monolithic and polylithic types, were it not for the evidence adduced above.

The special interest of 18 lies in the fact that in it was found the mud platform along which the sarcophagus lid was slid into position. It is strange that this was left, for the front was inscribed in paint and part of the inscription was concealed by this ramp (Pl. XXVI, Figs. 1 and 2).

Tomb 17 is a long, narrow trough and might be a poor burial of any period. As mentioned in the section on sarcophagi, part of the trough may have been covered with stone slabs.

Owing to the water-level, it was not possible to complete the excavation of 16. (This is of the type of which two other examples were found, Buch. G and Baq. 33. There was never any sarcophagus in these burials. Tomb 16 was the most elaborate of these, being divided into three chambers.) The outer chamber, which had a flat bottom, was completely cleared. The wall between this and the second chamber was then repaired and water was bailed from the second into the first chamber and from there raised by *shadufen magōz*[1] and carried away by a channel. In addition, a suction pump was working all the time from the innermost chamber. When the water had been lowered to the level of the top of the wall dividing the second and third chambers, this wall was repaired and made waterproof and an effort was made to clear the second

[1] A pair of shadufs, side by side, working in unison. To work these one of the men must be left-handed at this particular job.

chamber. All the soil from this was sieved and was found to contain Ptolemaic stone amulets. Men worked in relays all night so that the water-level should not increase. During the day a chain of boys passed up petrol tins of water in the intervals of passing up the soil. The water-level was lowered two metres, but after that the rate of increase balanced all efforts at drainage. The floor sloped down towards the east in the centre and there was a ledge on each side. To discover more than this would have meant either the installation of a steam pump or the use of much hydraulic cement. Neither of these courses seemed to be justified, as the amulets in the second chamber showed that the tomb had been robbed. Had they come from another tomb they would hardly have penetrated beyond the outer chamber. From the previous excavation of G it was obvious that we could expect little else but the remains of a mummy from the innermost chamber. A workman swam under water in the inner chamber, but did little beyond establishing its length and width and the fact that no chamber led beyond it. Pl. XXV, Figs. 5 and 6, show two views, looking north-west and north-east ; Fig. 5 looking back out of the tomb and showing the constructional stairs in the outer chamber and the stone blocking, and Fig. 6 looking down into the tomb. The roof of the third chamber can be seen just above water-level. Dr. Frankfort noticed a sloping brick pavement in the outer chamber and this was probably an adobe ramp similar to that recorded by us from G. There was quite a high chamber above the front of the tomb, the back of which can be seen in Fig. 4 of the same plate (which illustrates 15). Tomb 15 is of interest only as being, like 17, a particularly poor burial in a part of the Bucheum consisting for the main part of the earlier and better tombs. A large number of Ptolemaic stone amulets was found in both.

In 14 the niches, referred to in connection with M and the other burials of this type, can be clearly seen (Pl. XIV, Fig. 6). The same figure shows the blocking of the tomb. The innermost or stone blocking was one of the few pieces of masonry in the Bucheum not made of re-used blocks, but of original blocks of limestone. Possibly these came from a small quarry which we found in the foothills near-by. The blocking can be seen to rest upon a depth of filling, but this does not necessarily prove it to be much later than the tomb, as the sloping pit for the descent of the sarcophagus was probably deliberately filled in, in order to place the lid in position. The outside view, however, shows that the blocking rests on filling in the passage, Fig. 5, and unless the passage had rapidly accumulated rubbish—as it may well have done during digging operations —this would appear to prove that the blocking is later than the burial. In addition to the stone blocking there was also an adobe wall, and the burnt-brick wall in the passage had a false door, which has been referred to above and which is shown in Fig. 4.

The passage was dug down from above in front of this tomb and the sarcophagus may well have been lowered directly before the passages were constructed. It is not, however, at all certain that it was not brought from the north end of this passage.

H had only a mud blocking. The slight turn to the north of the slope of the ramp as it emerges into the passage is worthy of notice. This appears to show that the sarcophagus was brought in from the north end of the North passage, rather than from above, whereas in 14 the rock has been cut through from the surface.

G was one of the most interesting tombs in the Bucheum. As in 16, there was no sarcophagus, but here there were only two chambers instead of three as in the latter tomb. The inner chamber was a vault cut into the rock, with a steeper curve than that in 16. In the front chamber was a sloping adobe ramp, flanked on both sides (with intervening spaces) by two thick

adobe walls (Pl. XVII, Fig. 3). The ramp was undoubtedly for lowering the mummy, but the purpose of the adobe flanking is unknown. The bonding of these walls was irregular, ranging on the south side from 1·5 to 2 bricks thick and on the north from 2·5 to 3·5. This is accounted for by irregularities in the cutting, and on the north by the constructional stairway (Pl. XVII, Fig. 4) also. The size of the bricks in the walls was quite regular and they were constructed solidly of adobe. The ramp, on the other hand, consisted of a layer of bricks on rammed earth. The bricks themselves showed a wider range of sizes than was observed anywhere else in a single construction. The full variations can be seen in the register, but it is noticeable that in the centre of the ramp the general average was much higher than at the edges.

The stone blocking to the inner chamber was found intact (as can be seen in Pl. XVII, Fig. 5), but the chamber had been rifled from above. Wet sieving of the contents produced a series of faience amulets. There was a considerable depth of water, as may be seen from a comparison with the two last-mentioned photographs, but this was easily cleared with a single *shaduf*. A unique feature of the burial was the pavement with which the front chamber was covered after it had been filled in. This covered the whole of the ramp area, extending into what later became the passage (Pl. XIX, Fig. 5). A study of the elevation of the tomb shows that there was a chamber of considerable height above the tomb vault. The original roof was preserved for a distance of about two metres from the back. It is impossible to say how far forward this extended and at what point the cutting away to ground-level began. That the soil must have been cut away to the surface seems certain because this tomb is opposite to the east end of 10 and between the latter and the G ramp there is no room for a wall of rock substantial enough to support a roof. Moreover, as we have seen, there was an entrance into the chamber of 10 from the east end.

F, when found, had adobe blocking placed on filling (Pl. XCVIII, Fig. 7). It is probable that, like the bulk of the other tombs, it originally had a stone blocking which collapsed during one of the falls in this part of the Bucheum and was replaced by the blocking we found. There were the remains of a slight adobe wall between D and F, and this was probably inserted to repair a collapse in the intervening rock.

The stone wall outside D (Pl. XVII, Fig. 5) is about the height that we have determined from other sources for these blockings, but since the rock over it is not *in situ*, it may not be in its original condition.

There is little to be said about the other tombs on the east side of this passage. From them it was established that the stelæ were placed on flat slabs of rock in front of the tomb, leaning against the blocking (Pl. XXVI, Fig. 4, and Pl. XCVIII, Fig. 2), and were surrounded by the lamps, incense burners, etc. The height of the stone blocking of B was about two metres.

Collapse and rebuilding outside K were frequent, and it is impossible to disentangle the resulting complex. One buttress was built in the original stela niche outside K, and beneath it were found some fragments of a stela.

The height of the entrance to C was a little over a metre and a half (Pl. XIX, Fig. 4), and the stela was placed in the same way as that of B. The holes in the blocking of C may have been for the entrance of the soul, but it is also possible that they derived from a previous use of the blocks. The stela from here contains the phrase : " . . . mayest thou enter in and come forth . . ."

In front of the blocking to A the remains of an adobe pavement were found with fragments of charcoal embedded in the interstices.

Mention has already been made of the two bulls buried in the north end of the South passage, numbers 19 and 20, dating to Probus and Diocletian.

The Superstructures.

Plans of these were made by Mr. Emery during Dr. Frankfort's directorship, but unfortunately these were subsequently lost, and as the authors saw neither the plans nor the buildings it is difficult to interpret their meaning from the fragments remaining. We made a detailed study of these for bonds, brick sizes, etc., but did not re-plan them, as we were under the impression that much more complete plans existed. It is possible, however, that the walls were so destroyed that they were never very informative. Such is the case with the constructions at the entrance to the Bucheum which were excavated in the season 1931–32 and which are shown on the plan.

The outer temenos wall, which must be seen on the small scale inset in the plan of the Bucheum (Pl. III), is very crooked and was built with little care. The wall had been dug up for *sebakh*[1] and only fragments of brick remained, but it could never have been an imposing structure. It is interesting to notice that though there was a Coptic cemetery close to the walls at the north-east corner not a single grave was found within the area.

On the west side of the outer temenos were found the remains of a small building, but nothing of interest was obtained from this.

The inner temenos, which is shown on the large plan (Pl. III), was more nearly square and better built, probably at an earlier date.

Outside the entrance to the Bucheum are the fragmentary remains of a number of constructions, three of which, OK, OH and OE, were square mastabas, and two, OA and OB, the bases of adobe columns. A clue as to the purposes of these structures is given by the limestone hawk found close to the base of OA. This is shown in Pl. C, Fig. 2. A glance at the bonding of OA is sufficient to show that it is not part of a wall, but the base of a column (P1.5 a). OB is, less certainly, the base of a column also. In the neighbouring soil was found a fragment of limestone that *might* have been part of another hawk, but this was much too uncertain to be of value as evidence. It is noticeable, however, that fragments of three sphinxes were found and that there are three mastabas. It seems reasonable, considering the position of the hawk and the apparent absence of any other possible use for the mastabas and columns, to assume that the latter served to support the sphinxes and the hawk—or hawks. We have not been able to find any parallel for this arrangement with the exception of the two lions and the harpy found by Mariette at the Serapeum. These appear to have rested on some sort of mastaba.

It is worth noting that the brick sizes in OK, the only mastaba from which they could be obtained, are the same as those in OA. These constructions probably belonged to the second period of the Bucheum, the time when the entrance passage was first constructed. Pl. XII, Figs. 1 and 4, show the relationships of these constructions, and Fig. 2 shows a near view of the mastaba OK. The centre of this was filled with the rock dug from the Bucheum. There is no information to be obtained from the other fragments of walling which remained. The ground round OF and OG was littered with chips from the trimming of the sarcophagi, and these two structures may therefore have been rough shelters for the workmen.

Figs. 5 and 7 of the same plate show the remains of the superstructures which were found over the entrance passage. In Fig. 7, OR, built up against the rock, can be seen. It was

[1] A native term for any substances dug from the desert or from ancient buildings and used as manure on the fields.

behind this that two of the miniature toilet vases were found, and they seem to place the wall early in the history of the Bucheum. A number of other objects were found in these buildings during the season 1928–29, and these are marked in the registers as from the superstructures.

Fig. 6 shows the vault which originally stood over the south end of the North passage of the Bucheum. There was a very involved complex at this point. The first thing to consider is a rectangular depression cut into the rock on the north side of the West passage, corresponding in length (E.–W.) with the dimensions of the stone chamber of Buch. 10. This was almost certainly made in connection with the excavation of that burial, but its purpose is entirely unknown. Along the south side of this depression, inside the passage walls, ran a wall, OT, of A5 type. This crossed over the North and South passages at the arch and turned south along the east side of the South passage, so that it bordered the section cut in through the roof outside H. It was built after the cutting mentioned above had served its purpose and further work had been done; in all probability the excavation of G. The stairway opposite 14 enters the rectangular cutting on the east, but was evidently earlier than this, as the cutting cuts away part of the top stair. This is unexpected, and gives the impression that one of the first things done on the site was to excavate this stairway. A possibility not to be overlooked is that the stairway, despite the evidence adduced for its necessity, was not an integral part of the Bucheum at all, but belonged to a tomb of Petemestous (owner of the large situla) which was cleared away to dig the Bucheum. OY is a very rough wall running along the north of the cutting, built to stop the loose soil falling in. Most of the bricks are of the A5 type, some are half fired and may be later, but more probably are accounted for by a fire in the building. An attempt will be made to establish the date of this fire by the method of establishing the magnetic north which is "baked into" claywares.[1]

OU, OV, OX and OW are all Roman walls connected with vaulting over the south end of the North passage, of which OU was the latest and formed the vault seen in Pl. XII, Fig. 6. It is evident that there was considerable difficulty in building over this part of the passage a vault that would not collapse.

THE BAQARIA.

The arrangement of plan (IV) and elevations (CLXXIII) is the same as for the Bucheum. In the elevation sections 1 and 3 indicate the relative size and positions of the tombs, though, as will be seen from the plan, the line on which the sections are taken is not continuous. Section 2 shows the central passage, most of which was covered by a red-brick vault. The parallel lines show the slope and construction of the brick courses; in this section the burnt brick has been purposely left unstippled. Section 2 also shows tombs 15, 28 and 33. In the plan the brickwork of the North passage is shown as burnt brick, because the vault was burnt brick and so was much of the foundations, although the bulk of the walls were mud brick.

The architectural plates are from XX to XXIII and the tomb plates from XXVIII to XXXII.

The Passages.—A study of the architecture of the Baqaria makes it clear that the first two tombs are separate burials and that the West passage belongs to the third burial; but, as in the Bucheum, it seems more convenient in this study to work backwards from the final state, as we found it, to the earlier stages.

[1] Arthur Hopwood, in *Proc. Roy. Soc.*, Series A, Vol. LXXIX, 21–30, *The Magnetic Materials in Claywares*, discusses this, and gives a number of references.

The entrance or West passage was lined with burnt brick, but was probably not vaulted (Pl. XX, Fig. 1). There were no traces of passage walls earlier than those made of Roman burnt brick anywhere in the Baqaria. At the bottom of the West passage, above the refilled outer chamber of tomb 33, the passage forked north and south. It also continued through an arch to face the wall below the false door of 31 (Fig. 2). This passage was excavated to its present level at the time of excavating tomb 33. It existed previously as a high-level passage leading down to 31. Hence there would not have been enough soil above for a tunnelled passage. The court over 33 may have been open to the sky, the North and South passages being underground.

During the final period the North passage probably contained at least two, if not three, burials, but it had been badly disturbed by plunderers, who, though they left many of the tombs untouched, worked along the passage instead of through the tomb walls as in the Bucheum, and it is not possible to say with absolute certainty whether the bronze clamps (used for fastening the mummy to the board) and pieces of bone found represented burials, but it seems highly probable, for there was so little robbery in the neighbouring tombs that a large number of clamps in the passage could hardly be the result of plunder. Moreover, the dry stone walling at the north and south ends of the vault seem purposeless unless there were a burial (37) inside (Fig. 4). There is less evidence for the other supposed burial (35) at the north end of the passage, but here again it is difficult to account for the clamps by any other hypothesis, and the end of the vault was also bricked up (Pl. XXI, Figs. 4, 5, 6 and 7). Prior to these burials the passage was evidently vaulted with burnt brick throughout its length as far as the narrowing referred to above. This is proved by the two remaining arch bricks next to the narrowing in Fig. 4. There seems no reason to suppose that the paving in front of the assumed burial 37 (Fig. 1) extended farther than possibly to the stone gateway. There is nothing to show whether the burnt-brick vault is contemporary with the adobe walling on which it rests or not. The adobe walling includes burnt bricks and it may be only for economy that adobe was used. The walling is very much a thing of shreds and patches, and it seems probable that parts of it were built first as buttresses for a cracking roof, and that finally these were all joined up and the vault built on top, though not necessarily immediately. Pl. XX, Figs. 5 and 6, show the remains of the passage at this stage, looking north and south. Fig. 3 shows the stone gateway at the entrance. The history of this cannot be entirely unravelled and we do not know at what period it was first installed. On the south face of the lintel is an engraving of an ibis standing over one altar and a bull or cow over another. There is also an inscription in demotic, but neither Sir Herbert Thompson nor Prof. Griffith, who kindly examined photographs of this, were able to distinguish any of the words. Prof. Griffith considers that the inscription is probably Roman in date, and we have no reason to suppose that it was cut after the setting up of the doorway.

The archæological evidence also favours a Roman date for this construction. It will be seen in the photograph that the inner face of the west jamb has been chiselled away and the surface thus made to align with the walls of the passage, or the wall built to align with the stone. The east jamb appears also to have been set back from its intended place, as there is a line scratched across the step where it would have rested if it had been placed fully on the stone. It seems probable that the measurements were originally too narrow even for the brick passage. The brickwork filling between the jambs and the wall each side show how ridiculously small the gateway would have been for the earlier phase of the passage.

In the register will be seen the great variations in size among the bricks in the passage, and

the irregularities of bond. Outside 11 and 12 the walling is quite irregular and the bricks are laid without order. Outside 3 the wall is a mixture of brick and stone and includes a number of burnt bricks of varying sizes, which may have been taken from the vaults in the south end of the South passage. Outside 7 and 32 the wall has burnt-brick foundation courses, resting on rubbish, and above this is built of quite good mud brick which steps back at intervals of about 50 cm. (Pl. XXI, Fig. 3). The first step, at 110 cm. above rock-level, was to take the springing of the arch. No explanation of the other steps was found.

The narrowing of the North passage is an example of the complicated and *mūdilahlah*[1] state of the brickwork frequently found in this site. Five photographs of this are given (Pl. XXI, Figs. 4–7). From the first photograph it seems clear that the walling and vault were built up against a fall of rock, which, rather than remove, the builders incorporated, making a narrow entrance into the north end (tombs 14–17). But, though they left an entrance through, they did not bother to make a proper vault, unless they made one which later fell away. Again there was a fall of rock, as is evident in Fig. 7, where a lump of fallen material appears in the middle of the east side of the construction, entirely surrounded by brick except on the west, where an entrance was maintained. This was again built up, as is apparent from the wall above the fallen material. Again there was a fall of rock which buried two amphoræ, placed one each side of the door (Figs. 6 and 7). Finally the doorway was bricked up, probably to make burial 35. Such a complex as this, though not very interesting in itself, needs considerable time to disentangle.

That there are great differences of level and width between this stage of the passage and the earlier one, can be seen in Pl. XXII, Fig. 1, where the passage has been half cleared to the earlier stage. About half a metre of rubbish accumulated before the Roman passage was built, and under the Roman walls were found a number of objects buried in this filling. In the early stage the passage was a simple tunnel through the rock and most of the tomb entrances filled with adobe. Notice the extra width north of 32 and 3, under the temenos wall which indicates an intended end to the passage, which was later extended.

In the same figure can be seen the ramp leading down into 13, and this is still clearer in Fig. 2, which shows the east side of the passage, looking north. Figs. 3 and 4 are two general views of the passage at this stage, looking north and south respectively.

It can be seen from the few vault bricks remaining in Fig. 5 that the entrance to the South passage above the pit of 33 was vaulted. The passage then narrowed and passed under a plain rock roof supported by burnt-brick buttresses. (It is curious in this connection that in all the passages which were vaulted both in the Bucheum and the Baqaria the vault began after the entrance, there being in each case a section of rock roof at the entrance, except in the case of the stone lintel to the Baqaria North passage. It would be interesting to know the reason for this.) Fig. 6 shows the vaulting below the buttresses looking south. The sudden dip is caused by the ramp leading to 30, under which it was necessary to tunnel at this point, and which must, therefore, have still been open. On the east of the passage, just above and to the north of the robbers' hole, a new course of bricks appears, inserted at this point owing to the extra depth of the passage, which the builders of the vault wished for some reason to retain. This new course is a course of headers wedged between two courses of stretchers, and a little farther south another course is wedged in below the next course of stretchers, so that the bond is retained. Notice also in this

[1] Disordered; "all anyhow."

photograph the way in which bricks were wedged between the top of the vault and the rock. This is even better seen on Pl. XXIII, Figs. 1, 2 and 4, where most of the vault has, unavoidably, been removed by us. At the north end of this passage, outside 18 and 23, the bond W1a is varied to W1c, possibly to prevent coincidence of interstices. Between this point and the wedging in of new courses noticed above, the walls on both sides change their courses from headers to stretchers and vice versa. At the same time the normal vaulting is wedged by a " buttress " vault to negotiate the beginning of the slope. Unfortunately there was not enough left of this to enable us to record the construction. Below 19 the wall thickens to W2a. The " buttress " vault occurs again where the passage flattens out, outside 20. Between 25 and 26 the wall thins down to W1.5a, and between 27 and 26 widens again to W2.5a, with variations of 2.5a1, in order to fill in hollows in the rock. It is evident that this vault was built in a passage which had not been cut for it. In fact, it is probable that the passage was cut as the tombs were required and that the vaulting was as much an afterthought to the original excavation, though closer in date, as that in the North passage. It should be remembered that the vault was certainly built from the lower end, the south, upwards, and probably the walls also, so actually where a process is referred to as adding courses it should really be leaving them out.

Pl. XXIII, Fig. 1, and Pl. XXIX, Fig. 1, illustrate how the passage dips to avoid the ramp to 30 and shows that the walls were built subsequently to 18, 19 and 20. Though not so apparent in Fig. 2, they were equally obviously built after 23, 24, 25 and 26. The passage wall did not pass in front of 21, and in Fig. 7 the wall in front of which the metre rod is lying shows the face of the wall turning the corner. The vaulting must therefore have ended at the beginning of 21 and 26, and the wall must have continued without an arch in front of 26 and 27, abutting on 28. The earlier state of the passage was evidently similar to that of the North passage. The burnt brick in this passage was left, since there seemed no possibility of finding anything of importance underneath it. The offering tables, stela and pottery were placed outside the wall, and as this, unlike the North passage, was built directly on to the rock, there seemed no justification for removing any more of it than was necessary for safe working.

The Tombs.

It is easier to begin by considering tomb 30, though quite possibly 31 was the first built. A ramp ran down to this which will be seen to be much shorter than the West passage and also much shallower. Probably the sarcophagus was slid down this, but that cannot be accepted as certain, for the pit was open to the sky and the sarcophagus may have been lowered directly from above (Pl. XXXI, Fig. 3). In the pit in which this sarcophagus stands are two curious niches at the west end which must have served some purpose in lowering the sarcophagus (Pl. XXXI, Fig. 4). An adobe vault (Fig. 2) was built over the latter and a false door built in front of the tomb (Fig. 1). It is probable that the pit was then filled in. The false door was stuccoed and whitewashed and an adobe pavement laid in front. It is uncertain whether the lower part of the ramp was tunnelled or open to the sky. The relationship of the false door and the pavement to the South passage can be seen on Pl. XXIII, Fig. 1, and Pl. XXIX, Fig. 1. In Fig. 6 of the same plate is a rough curved adobe wall which stood on the north side of the pavement above 19. The only purpose that can be seen for this is to prevent a collapse into 19, but this explanation presents difficulties, as the bricks are of the A5 type (19 is a Roman tomb), and since

they are of a very different size from those of the pavement or the door, they do not seem to have been taken from those structures. The wall is also shown in Pl. XXXI, Fig. 1.

Tomb 31 was of a very similar construction, and the apparent differences are largely deceptive and due to the building of 33. In Pl. XX, Fig 2, and in the plan, two walls will be noticed in place of the single false door in front of 30 (see also Pl. XXXII, Fig. 1). The upper wall, the most easterly, is the base of a destroyed false door resting on rock, and the lower wall is built up against the face of this. The explanation of this complex is that the ramp to 31 originally ran at the level of the bottom of the false door, exactly in the same way as does that of 30, and the lower wall is of a later date and connected with 33. The construction of the vault of the tomb is excellent and the brickwork will compare with that of any period in any country. The bricks, of A5 type, were laid together with no mortar at all. The vault, A4a, stood the test of time well, and as can be seen in the corpus of brick bonds, is of excellent construction. According to Molesworth (30th edition), the thickness of crown for an arch with radius 4ft. should be ·8ft., but this refers to burnt brick. The crown of 31 is 2·4ft. thick (even the burnt-brick arches have a crown ·9ft. thick for a radius of 2·3ft., compare with ·6ft. which is the figure given by Molesworth).

Differences between this vault and the vault of 30 can be seen in the plan, and also in the photographs on Pl. XXXI, Fig. 2, and Pl. XXXIII, Fig. 2.

Tomb 33 is one of the deep type without sarcophagi, of which the two examples in the Bucheum are 16 and G. The explanation of there being only one of these in the Baqaria seems to be that the mother of the bull of Darius III died while there was still sufficient wealth to give her a burial like that of the mother of the bull of Nekhthorheb, i.e. in 30 or 31. Baqaria 33 is therefore to be equated with Bucheum 16, which it resembles in having three chambers. Evidently the ramp of 31 was cut down to a lower level as far east as the false door, and then the wall mentioned above was built against the rock face exposed. The fact that the bricks are the same size as in the false door would be explained by re-use of the bricks of a pavement, similar to that in 30, which we may suppose to have led to the false door. Whether the whole of the courtyard was excavated at this date or was widened later is doubtful. The outer pit has constructional stairs on the north, like Bucheum 16, and mud bricks found in it in 1927 may have been the remains of an adobe ramp, yet there is the beginning of a ramp sloping down to the top of the pit on the west, cut into the rock. The angle of any such ramp would have been very steep in this pit and, if a ramp had been required, it would surely have been simpler to have left the rock standing. No advantage is gained by cutting out the entire pit, but this was certainly done in G, where a ramp was made. Pl. XXXII, Fig. 4, is a view of the outer pit taken from the second chamber looking west. The water-level is much higher than is apparent in the photograph, which was taken the moment bailing was stopped. Fig. 3 shows the third and unfinished chamber, which turns round to the north. The mastabas are probably only sections of the rock not finally cut away. The method of removing by big blocks is familiar and was used in Bucheum S, also unfinished, where the blocks, cut out but left, were found. The cow was buried just inside the blocking wall. It is possible that the third chamber turned to the north for fear of striking 31.

With the exception of certain tombs having minor peculiarities which will be noticed later, the tombs are so alike in the North passage that one description will suffice for them.

The tombs are small rectangles, necessarily roughly cut owing to the soil in which they were

excavated. This can be seen in Buchanan's elevations and it is easy to realise that in such a loose conglomerate no care in cutting could produce really neat tombs. The entrances were mostly filled with adobe, though one was stone, one or two adobe and stone mixed, and one, 5, mud only. Tomb 13 had a small ramp and 1 a still smaller and steeper one. In 13 no blocking was found. Tomb 32 was never excavated throughout its length to its full depth, but when the lower half was cleared half-way back this was filled in again and the mummy placed at the higher level. The complex of walls over 32 and 7 is very intricate, but is assumed to be no more than a support for the roof at this point. It is likely that this was put in after a collapse, but prior to the building of the burnt-brick vault. It was not all built at the same time, as far as can be judged, but was probably all subsequent to the finishing of the tombs in the North passage.

The ledges of 4 and 16 comparable to those in 18 and 23 should be noticed. The similarities between tombs which are next to each other are noticeable, especially in the cases of 1 and 13, 6 and 32 (see elevation), 7 and 17. Fifteen is unlikely to have been a tomb, though it was walled in. No remains of a burial were found in it, and it is too small for such a purpose. This leaves us with 35 burials for the Baqaria, counting the two assumed burials in the passage, against 36 in the Bucheum. It would be expected that if the numbers were not even, there would be one more cow than bull, the probability being that the cow would die before the bull, and having been buried, the bull would be destroyed by the Christians. It seems therefore probable that there was another burial either between the back of the vault burial, 37, and the remains of a burnt-brick wall (Pl. XX, Fig. 6), or outside the Baqaria, or both. On pp. 77–78, where votive stelæ are described, the question of whether the Petrie and Cairo stelæ belong to cow burials is discussed. If they do, they might be expected to have come from outside the Baqaria, as did the similar stela from 29. With the number of burials known, two more might be expected. If these were outside, they almost certainly lie under the *ʿEzba*[1] and have been robbed.

This brings us to the problem of the complex 11, 12 and 34. When we excavated these they had been completely cleared except for a few hooks and some sherds ; it is thus impossible to estimate the number of burials by any remains. The collapses that took place in this corner make it difficult to trace the relationship between the three from architectural criteria. The blocking of 12 is earlier than the *outer* blocking of 11, for 12 had two layers with some fallen rock between them ; the outer blocking of 11 rests upon this layer of fallen rock, but is possibly only a replacement. The probable explanation of this complex is that 34 was an abortive attempt to dig the North passage, abandoned in favour of the present situation (cf. the North bay in the Bucheum). Tomb 11 was next dug and then 12, in each case the unrequired parts of 34 being bricked off. The inner blocking of 11 was prior to the fall of the roof.

Pl. XXVIII, Fig. 5, shows four burials, 4, 14, 16 and 17, all exposed at the same time. The entrances to most of the other tombs are shown in Pls. XXII and XXIII.

In the South passage the two tombs 18 and 23 stand apart from the others as being completely different in construction, and belong to the same type as those at the north end of the North passage. All the other tombs had burnt-brick vaults and in many cases these were fortunately standing and from these the vault types in the Bond Corpus have been made. There are two main types of vault, the parabolic and the barrel vault—A1b, and A1b1 and A1a,

[1] عزبة A village or hamlet, lit. farm.

A1c and A1d, but they do not appear to have chronological significance. The blockings are various ; in 19 and 20 there was none, and in 24 the blocking was only half a brick thick. There are certain indications as to date. Tomb 19 must have been earlier than 20, because the wing wall which was built against the rock wall serves no purpose now, and moreover, 20 was obviously dug away to the south when the wing wall was struck. Burial 28 must be later than 22 and 27 and was certainly the latest tomb in this end of the Bucheum. On Pl. XXIII there are various views in Figs. 1–4 of the south end of the Baqaria in which some general ideas of the vaults can be obtained. In Fig. 6 is shown the small platform for stela or offering tables outside 27 and 28. The inside of vaults 25 and 26 are shown in Figs. 1 and 2 of Pl. XXX. It will be seen that there is a niche, or window, in the back of 26. This is intentional and not made by robbers, but its purpose is unknown. The outsides of 25 and 24 and the inside of 26 is shown in Fig. 3 : the remains of 27 in Fig. 4. Pl. XXIX, Figs. 2 and 3, show the insides of vaults 19 and 20. As will be seen, 19 has no wall at the back, but only rock. Fig. 4 shows the great length of 21 and the completeness with which the vault was removed anciently. Fig. 5 shows, at the top of the photograph, the holes for the timber scaffolding, showing that there was a vault in here originally. In the centre hole is seen an actinometer (about the size of a pocket-watch).

The remaining cow burial, 29, at a distance from the Baqaria on the other side of the Baq. R. Village can be seen in the plan of that village. It consisted of a shallow, roughly rectangular pit in which the cow was laid contracted on its right side with the head to the South. Immediately to the west of this were the remains, one course only, of a small square adobe building with walls two bricks in thickness. In the centre of this was let into the ground a pottery chest, triangular in plan (see p. 90). This contained an uninscribed stela of the cow and other objects. The burial belongs fairly clearly to the time of Diocletian by the evidence of the lamps found with it.

Superstructures.—There was practically nothing in the nature of superstructures at the Baqaria. The slight remains of a pavement at the top of the West passage have already been mentioned. The building inside the temenos is described with the Baqaria Roman Village. The temenos wall was better than that of the Bucheum, but only the foundation courses were found. In these the bond was varied in such a manner as to fill in the irregularities in the desert surface and enable even walling to be built on top of the foundation courses. The variations in size of the bricks is within the normal error for one construction. In some cases the bricks were placed diagonally.

The Unit of Measure. (Mr. C. A. Earnshaw has collaborated in this section.)—In attempting to discover the unit used in the construction of the Bucheum it is necessary to keep certain facts in mind. Not more than two bulls of average length life would be buried during one man's lifetime, and the homogeneity of the place is largely illusory. The slack manner in which new burials were excavated between two old ones, to avoid the trouble of extending the passages, and the consequent collapses and rebuildings have made the place as irregular a hotchpotch as one could hope to avoid. *The Apis Papyrus* gives us no measurements for tombs, and M. Mariette's published plans are so insufficient and so minute in scale as to be useless. *The Apis Papyrus* shows us that the measure used in the funerary objects was probably the Divine cubit and this is discussed in connection with the pottery.

Discretion must obviously be used in seeking to induce a unit of length from such a building as the Bucheum. It was cut in soft and crumbly materials of uneven texture. The work was

done underground by lamplight and between the excavation of each tomb there was an interval of time of approximately twenty-five years. Some parts must be ignored from their obvious lack of metrical qualities, whether due to subsequent falls, to the original workmanship, or to both, and of these the group of Late Ptolemaic and Early Roman tombs in the South passage is the most apparent.

There are two sources from which reliable data may be drawn : (1) The Roman tombs from Tiberius to Maximinus (with the exception of No. 6), all of which were evidently built to standard dimensions. From these the unit used can be induced quite simply from the arithmetic means of the widths, lengths and overall-lengths. (2) The early tombs from Nekhthorheb to Ptolemy III (omitting 18). With these the method used above breaks down because there are several different types of tombs, and the tombs must therefore be taken either singly or in small groups. As all inductions are open to suspicion, it seems best to set forth the data and process here.

In the first column, marked " Dimension," stands the linear measurement in metres. Against it, in the column marked " Multiple," stands the number of units (cubits) which we suppose the builder to have been aiming at, and in that marked "Unit" the length (in metres) of the cubit given by dividing the dimension by the multiple.

Where the Dimension column is followed by one marked " Mean " the latter contains the mean of two or more measurements in the Dimension column, all of which may reasonably be supposed to have been intended for the same number of units (cubits). Brackets round a figure, except where otherwise stated, indicate that it has been discarded as being too obviously wide of the mark to have been intended for the same length as the others in its group.

INDUCTIONS.

Buch. 10. (Nekhthorheb)

		Dimension m.	*Multiple*	*Unit* m.
Chamber. (Out.)	W.	6·8	15	·452
	L.	6·8	15	·452
(In.)	W.	3·85	8½	·453
	L.	4·80	10½	·457

Offering Vault.			*Dimension* m.	*Multiple*	*Unit* m.
(Out.)		W.	6·65	14½	·458
		L.	8·25	18	·458
(In.)	(Roman Restn.)	W.	(3·2)	—	—
		L.	7·2	16	·450
	(Roman Restn.)	L.	(6·0)	—	—
					·454
					±·008

Buch. G and 16. (Alexander I, and IV.)

		Dimensions m.	*Mean*	*Multiple*	*Unit* m.
Inner chambers (Lower)	W.	1·7, 1·9	1·8	4	·450
	L.	3·9, 4·0			
Outer chambers (Upper)	W.	3·95, 3·90	3·94	9	·438
„ „ (Lower)	L.	4·9, 4·85			
Inner chamber G. (Upper) (at back)		4·8	4·85	11	·441
Outer chambers (Lower)	W.	2·3, 2·2	2·25	5	·450
Outer chamber 16 (Upper)	OL.	6·3		14	·450
Middle „ „ „	L.	3·4		7½	·452
All upper chambers 16 without door	OL.	13·2		30	·440
All Do. for G.	OL.	9·2		20	·460
					·448
					±·011

(OL. stands for overall length.)

Buch. S, H, and 14. (Ptolemy II—III)

			Dimensions m.	*Mean*	*Multiple*	*Unit* m.
Alcoves (Outer)	S.	L.	2·3, 2·4			
	H.		(1·95), (1·95)			
	14		2·3, 2·4	2·34	5	·468
Chamber	S.	W.	2·2			
	H.		2·5			
	14.		2·4			
Alcoves (Inner)	S.	L.	(2·4), (3·0)	—	—	—
	H.		4·2, 4·2	4·2	9	·466
	14.		3·7, 3·7	3·7	8	·462
Chambers	S.	L.	6·7			
	H.		6·9	6·87	15	·457
	14.		7·0			
Over all with door	S.	OL.	—			
	H.		7·7	7·65	15½	·461
	14.		7·6			
						·463
						±·001

Roman Tombs.

No.	Width. m.	Length. m.	Overall. m.
1.	2·55	4·75	
2.	3·2	4·4	
3.	2·7	4·7	
4.	2·2	4·2	
5.	2·8	4·8	
7.	2·6	4·5	5·5
7a.	2·8	4·5	—
8.	2·7	5·2	6·1
11.	2·5	—	5·0
12.	2·8	4·1	4·8
13.	2·8	4·6	5·3
N.	3·0	4·9	6·3
O.	3·4	5·1	5·9
23.	2·7	(3·5)	—
Means	2·77	4·65	5·56
Multiple	6	10	12
Unit	·461	·465	·463
	±·004	±·005	±·01

Weighted mean unit :—·463 ± ·003.

(Weighted proportionately to the inverse squares of the probable errors.)

Of the above inductions that from the Roman tombs is the most satisfactory, with multiples of 12, 10 and 6. To obtain anything approaching a Royal cubit from these tombs it is necessary to assume multiples of 10½, 9 and 5¼, else the resultant cubit is not only outside the probable error of the Royal cubit, but outside the largest known variation. The least satisfactory induction is that from G and 16, for, apart from the large error, we have the awkward multiples of 11 and 7½ (7½ may perhaps be regarded as half of 15 and in that sense not so improbable). The apparently unlikely multiples of 8½, 10½ and 14½ in 10 are explained by wall thicknesses which would be laid out in units of half a cubit or less. The method of induction used is described in full, together with the philosophical arguments underlying it, in Petrie, *Inductive Metrology*.

There are here two units : ·452 ± ·002, from 10, G, and 16; and ·463 ± ·003, from S, H and 14, and the Roman tombs (these are the strictly weighted means).

The first appears to be the Short cubit marked on the rods, the length of which has been described by some as six palms of the Royal cubit, and by others as twenty-four True digits. The present result is closer to the former length, but the possibility of its being the latter should not be excluded.

The second coincides remarkably with the value usually given for the Greek Olympic cubit, i.e., $1\frac{1}{2}$ Olympic feet. Boeckh and others (following Jomard)[1] believed that this cubit was used in dynastic Egypt. Jomard's conclusion, however, has been open to much doubt since 1882, when Petrie showed that the previous measurements of the base of the Great Pyramid, on which Jomard relied, were incorrect. Petrie in *Inductive Metrology* had previously suggested that this cubit might possibly have been derived from twenty-five True digits. In the Bucheum itself it does not appear until the reign of Ptolemy II, when it replaced the old Egyptian short cubit. This supports the view that it was a Greek introduction, and although it is apparently found in pottery of a somewhat earlier date, this does not seriously disturb that conclusion, as Greek influence was already strong in the reign of Nekhthorheb.

The possibility that the old Short cubit is the Divine cubit remains, but no final conclusions can be drawn on this point. (See further in the discussion of the pottery, pp. 86–89.)

In the Baqaria the problem is more difficult. A glance at the plan shows that the greater number of the tombs, if not definitely ametric, are insufficiently accurate for it to be worth while attempting to find the unit used in their excavation. The only hopeful sources of information are the Roman red-brick vaults and tombs 30 and 31.

In the former the relationships of the means of the external and internal lengths and widths (which have quite a low probable error) are 19 : 11 and 16 : 8. Taking these as 7 : 4 and 6 : 3, the unit is $\cdot 536 \pm \cdot 002$ m. (which is too high for the Royal cubit), as 9 : 5 and 7 : $3\frac{1}{2}$ it is $\cdot 441 \pm \cdot 005$, and as $9\frac{1}{2}$: $5\frac{1}{2}$ and 8 : 4 it is $\cdot 397 \pm \cdot 001$ m. The last named is the most satisfactory induction, for not only is there a smaller probable error on the unit itself, but the ratios agree exactly with the measured values and not approximately, as do the two former.

Tombs 30 and 31 are less easy to handle. They are not of similar dimensions and so a mean cannot be taken of the same relative measured lengths in each. Taking each tomb separately, all but two of the five or six different measured lengths obtainable are wall thicknesses and these are the least satisfactory lengths for induction. Three not very satisfactory alternatives for the unit were obtained from these two tombs—the Greek Olympic foot, the short cubit, and a unit of ·396 m. Any deductions from such a result must be very tentative, but, if a mean be taken of the last-named unit and of that obtained in the Roman vaults, the resultant unit is $\cdot 396 \pm \cdot 001$ m. This is about twice the Little span, the length of which is known to be about 20 cm. Though these results are unreliable, it is worth noticing that the lengths are mostly derived from wall thicknesses and that the brick used in the walls of 30 and 31 was about 38 cm. in length. This suggests that dimensions in brickwork were governed by the dimensions of the bricks rather than vice-versa.

[1] A. Boeckh, *Metrologische Untersuchungen über Gewichte, Münzfüsse und Masse der Altertums*, Berlin, 1838. E. F. Jomard, *Mémoire sur le Systéme métrique des anciens Egyptiens etc.*, Paris, 1817.

CHAPTER IV

BUILDING MATERIALS

Masonry.—There is little stone construction of any importance in the Bucheum and Baqaria. The stone vault over burial 10, of which only the walls remained, was the only example of masonry worthy of the name. The walls rested on native rock and were only three courses high. The vault was sprung on flakes of granite embedded in cement[1] (Pl. XXIV, Fig. 6). One shaped block belonging to the vault was found by Frankfort, but the rest had been quarried away. The stone used was sandstone, and the blocks showed no signs of previous use : everywhere else in the Bucheum blocks from older buildings were used (except in the limestone blocking of 14). As "Les Grands Souterrains" were used "depuis Psammitichus . . . jusqu'au derniers Ptolémées" (*Le Sérapeum de Memphis*, App. p. 122), it is certain that this construction was not copied from the burials of Apis. The later tombs of Mnevis may have contained the prototypes of this vaulting. Two lintels were found in the Bucheum. One was a re-used sandstone monolith of Thothmes III, supported on brick buttresses (Pl. XIII, Fig. 4, and Pl. LIV, Fig. 1). The other was an original limestone monolith (Pl. LV, Fig. 4) ; but there is no record of the position in which it was found. In the Baqaria the only masonry was a doorway of four slabs of sandstone. In the Bucheum many of the entrances to tombs were blocked with stone ; but these wallings were crudely made of re-used blocks of varying sizes cemented together, and little can be learnt from them.

The sarcophagi are described in Chapter V.

Brickwork.—The dating of the various burials and passages of the Bucheum is one of the most difficult problems of the Bucheum to solve. A careful study was made of the brick size interstices and bonds, in order to obtain all the assistance possible from this source.

The Bonds.—The customary method of recording bonds by a verbal description, or by separate drawings of each section of wall which is bonded differently, is exceptionally tedious and not very illuminating ; it was decided, therefore, to make a corpus of the different bonds, and it was soon found that not only was this system a great saving of labour, but also that it could be extended to include the bonds used in every country, at all periods, by the addition of only a few more pages.

Even thick fortress walls would present no very great difficulty, as, after a thickness of five or six bricks is reached, the varying thicknesses are alike in bond, except for the number of bricks used, and could be recorded by symbols only.

The method of arranging the bonds has been to give each type of brick construction a letter indicative of its use : thus W stands for wall, B for buttress, A for arch, R for repair, and P for pillar or column. The negotiation of corners is included under C, but this is largely a matter

[1] The use of the word "cement" is not intended to imply any specific composition.

of brick sizes. Next to the letter is placed a number describing the thickness of the construction ; ·5 meaning a wall the width of one brick in thickness, 1, the length of a brick in thickness, 1·5, a header and stretcher in thickness, and so on. Finally an arbitrary small letter is added to describe the arrangement. As far as possible the same arrangement in the different thicknesses is given the same small letter. Thus it will be seen in the corpus on Pls. CII to CIV that d. always signifies a construction in which a course of stretchers alternates with a course of two headers and two headers on edge. It will be obvious that bonds are to a large extent governed by the sizes of the bricks, though a variety of bonds can be obtained with bricks of any one set of dimensions. In buttresses queen bats and bats[1] are often used as closers. Throughout the book, bonds are referred to by their corpus numbers as W1·5a, A1d, P2a, etc., as the case may be.

The Bricks. (In collaboration with Mr. C. A. Earnshaw.)—Both mud bricks and burnt bricks are found in the Bucheum. Mud-brick constructions are referred to throughout as adobe[2] and burnt brick as burnt brick. Unfortunately both burnt brick and adobe were used after the introduction of the former material. The main criteria applied for the discrimination of different periods of brickwork are the size and composition of the bricks and thicknesses of the horizontal interstices.[3] While the latter is a good guide to the quality of brickwork, increasing as the work deteriorates, vertical interstices are useless, being frequently negligible in very bad work and sometimes quite large in work of reasonably good quality. Moreover, they depend to a large extent upon the proportion of the bricks, and the bond used.

In classifying bricks it seems simplest to take two main classes : Class A, adobe, and Class B, burnt brick. Secondary divisions would appear to be best made by materials. There are in this site two obvious such divisions of Class A, which we have called 5 and 6, so as to leave space for bricks of other periods in later work. A5 consists of bricks made of Nile mud and *tibn*[4] only, there being no apparent addition of sand, though qualitative analyses have not been made. These bricks, though well shaped, are fragile and crumbly. In A6 the bricks have less *tibn*, but have sand added to the mud in varying quantities, and are, as a rule, not so well shaped as those in A5, but stronger. No subdivisions of B have as yet been observed.

Tertiary division of the bricks must be made by size and this is a very complicated matter. The only serious work on this subject we have been able to trace is that by Petrie in *Abydos* II,

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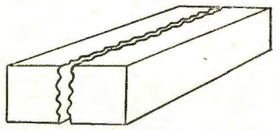
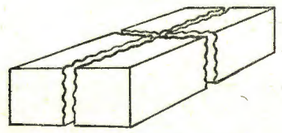
[1] A brick subdivides into two " queen bats," thus—



or four " bats " thus—



Two " half-bricks " result when a brick is broken at right-angles to the method used to obtain " queen bats."

[2] Adobe : an American word, now being shortened to " dobe," which reached the U.S. *via* South America, Spain, Morocco and Egypt. The Spanish derived from the Arabic الطوبة (*at-tūba*), the brick, derived in its turn from the ancient Egyptian (*ḏb.t*), having the same meaning.

[3] We are indebted to Dr. Gilbert Bagnani, of the *R. Missione Archæologica Italiana in Egitto*, for putting us on the track of this valuable criterion, which is much used for dating brickwork in Rome. He further assured us that there is a lady, working in Rome, who can date walls to the reign of an Emperor by the taste of the plaster. Our efforts to emulate this enviable accomplishment produced nothing but an attack of *mal de mur*.

[4] Chopped straw.

which deals with the sizes of bricks from the First to the Eighteenth Dynasty. The method there adopted is classification by width measurement ; but, though this is fairly satisfactory as a broad basis of division, it takes no account of variations in thickness. The width of a brick is almost invariably half, or slightly less than half its length (if $L = 2W - \frac{1}{2}\Delta$, Δ is the width of a vertical interstice in bond W1a), while the ratio of length to thickness varies within fairly wide limits. The shrinkage must also be taken into account and this again varies greatly according to composition and manufacture. In fact, the problem appears almost insoluble where the brick sizes are closely graduated, probably in units which are themselves less than the average variation from normal of hand-made brick.

As a test we took the means of the lengths, widths and thicknesses of a large number of modern English bricks and found that it was not possible to deduce the intended size, either by induction or by trial and error, although the dimensions were known to be in inches and fractions of an inch. The cause is twofold : (1) modern bricks being made to one-sixteenth of an inch the measurements bear no simple relationship to each other, therefore ruling out the inductive method ; and (2) the variation is greater than the unit used, one-sixteenth of an inch. (It should be remembered that where the sizes of bricks are very close, it is necessary to take into account the maximum variation from the mean, rather than the probable error, as it is desired to establish a method of placing every brick, other than oddities or obviously badly-made specimens, into its proper class.)[1]

Before the immense difficulties of the task had been appreciated, several attempts were made to plot the brick sizes in the hope of finding satisfactory groups. This was attempted by length only, by the ratio of length to thickness, by a combination of length and ratio, and by the total volume, and it is probably by the latter criterion that any future progress will be made, because with this method the unevenness due to position during shrinkage, etc., is ironed out. The greatest difficulty would appear to be that, even if the correct groupings and the units used be found, the large bricks of one group will overlap the small bricks of another, thus making it almost impossible in practical field work to allocate small structures to their proper class.

For the purposes of the present volume the bricks have been divided only into classes and sub-classes, such as A5, A6 and B, and, if it be found possible to come to any conclusions with regard to the sizes, the results will be published separately.

In the text of the architectural section bricks will be referred to only by their class numbers, but a register of all the sizes found is given on pp. 50–52, so that these may be available.

It is worth mentioning that one of the difficulties of forming groups of the sizes was due to the fact that the bricks were only measured to the nearest half-centimetre. When taking a mean of a group of bricks it would appear advisable to measure the bricks to the nearest millimetre, however coarse they may be, so that the accuracy of measurement may be considerably greater than that of manufacture.

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[1] For much of the information about modern bricks we are indebted to the Director of the Building Research Station at Garston, near Watford, and facts supplied by him will form a basis for further investigation.

PROVENANCE	BOND	INTERSTICES cm. (V=Vertical H=Horizontal)	TYPE	SIZES OF BRICKS cm.
BUCHEUM				
Pavements at top of W. passage.				
Bottom : Edgers and Headers. (Elev.)		Irreg.	A5	29½ × 14½ × 9
Middle : Headers. ,,		,,	A6	30 14½ 8½
Top : Stretchers. ,,		,,	,,	31 15 9
W. Passage walls.				
W. of lintel. S.	W 1·5 a	1·2	A6	31½ 15 10
(4cm. filling) N.	W 2 a	,,	,,	35 16 11½
Varies in order to step down.	W 2 c	,,	,,	33 16 10½
Wall running at right-angles by the lintel ; not bonded to above	W 1·5 a	·7	,,	33 16 10
E. of lintel. S., at top.	W 1·5 a	Irreg.	,,	29½ 14½ 8
Widens by half a brick in three courses to	W 3 a	,,	,,	,, ,, ,,
N. Upper wall.	W 2 a	1·5	,,	29½ 14½ 8
Lower wall. (Old.)	R 2 a	Irreg.	A5	34 16 11
(New.)			A6	30 14 8
Remains of arch over this section of the passage. (See text.)	A 1 b	1·5	,,	36 18 5½
Passage between Bay 1–5 and N.–S. passage. N.				
N. Inner wall. (Against soil.)	W 1 c	.2	,,	31 15 10½
Lower wall.	W 1 e	Irreg.	,,	31 15½ 9½
Outer wall. (Built on above.)	W 1 a	1.0	B	33½ 16 6
S. Outside 9.	W 1·5 a	1·0–1·2	,,	32 16 7
Repairs to above.				
N.	W 1·5 c	Irreg.	,,	31 15 10
S. Outside 9.	W 2 a	,,	,,	,, ,, ,,
N.–S. Passage.				
Arch entrance on N.	W 1 d	·7–1·0	,,	Fragmentary.
(With variations to one header on edge to fit length.)				
W. buttress S. of 11.	B 1 b		,,	,,
W. wall between arch and buttress where gebel is close ; ranging to	W 1·5 a		,,	,,
	W 3 a		,,	,,
E. wall	W 2 a		,,	,,
Q. (N. end of passage)				
Burnt-brick wall ;	W 2 d	·7	,,	30 15 7
at corner	C 2 d	,,	,,	,, ,, ,,
Mud-brick wall.	W 1·5 e	·2	A6	30 15 8½
Outside F, G and H (now removed).	W 2·5 a	1·2	B	36½ 18 8
Mud wall above H (Roman).	W 2·5 a	1·2	A6	34½ 17 10
Burnt-brick filling between above and wall of Horemheb blocks.	W 1 c	·7	B	33 16 7
Tombs.				
9. W. wall.	W 1·5 a	·7	B	32 16 7
E. wall.	W 1 a	·7	B	32 16 7
S. wall.	W 1 e	1·2	B	30 15 7
Blocking.	W 1·5 a	1·1	B	32 16 7
10. Offering vault.	W 3 a	0	A5	38 18 12
	A 3 a	0	,,	37 17 6
Restored.	W 3 a	1·0–1·5	A6	31 15 10
Wall on West side.	W 2 c	V.·6, H.1·2	A5	29–31½ 14–15½ 10–11
14. Inner blocking.	W 1·5 a	·3	,,	33 15 11
G. Ramp.				
S. side wall.	1·5–2 Irreg.	0	A5	33 16 10
N. side wall.	2·5–3·5 ,,	0	A5	33 16 10
Edges of Ramp.				35 16 ?
				35 14 ?
				36 16½ 10
				34 15 9
				33 15 10
Centre of Ramp.			A5	36 15 ?
				38 17 ?
				35 16 ?
				35 15½ ?
H. Blocking.	W 2·5 a	0	A5	32 13 11

PROVENANCE	BOND	INTERSTICES cm.	TYPE	SIZES OF BRICKS cm.
OA. Column Base.	P 1·5 a	·8–1·0	A6	32 16 9
OC.	Unre	cordable.		
OD.		,,		
OE. Fragments of bottom course only.		,,		
OF.	W 1 c		B	28½ 14 7½
OG. One course only.	W 1 a ?		A6	
OH. Fragments of bottom course only.	Unre	cordable.		
OK.	W 1·5 a		A6	32 16 9
OL.	W 1·5 a	·5	A6	34½ 17 9
OM. One course.	W 1 c		B	29 15 8
ON.	Unre	cordable.		
OR. Built against the rock. Course unrecordable. Re-used bricks.		Var.		34 16 10
				31 16 9
				33 16 10
				31 15 10
OS.	W 1 c			
OT.	W 2 a	·1 (sand)	A5	38 18 12
OU. Roman wall.	W 1·5 a		A6	32 14½ 11
Arch.				38 18 6 ?
OV.	W 1·5 a	?	A6	32 15 10
OW. Re-used bricks with wide range of size.	W 1 a		B	29½ 16 8 to 34 16½ 7½
OX. Wall.	W 1·5 a		B	30½ 15 8
Springing to arch ? Edger-headers.			B	29 13½ 8
OY. Very irregular ; see text. Some are			A5	38 18 12
BAQARIA.				
N. Passage.				
Pavement N. of stone gateway.			B	28 14 8
Vaulting over passage :				33 16½ 11
Sides.			A6	31 15 10
Ends.	W 1 a		B	28 14 8
Vault.	A 1 c		B	31 15 7 / 26 26 7
Wall outside 8 and 9.	W 2 a	·8	A & B	32 16½ 11
Filling above 3.			B	31 15½ 7
Wall outside 5 and 6.				
Foundations.	W 1 c		B	30 15 9
Wall.	W 2 a		A6	33 15 10
Pavement outside 5.			B	29 14 7
High level wall at 6 and 7 :				
Foundations.			B	30 15 9
Wall.		·7	A6	33 15 10
" Narrowing " :				
S. Side. Bottom of wall at sides.	W 1 d	·7	A6	33 16½ 11
Foundation and extra course.	W 1 c	·3	B	30 15 7½
(Same in passage-way.)				
N. Side. Sides.	W 1 d	·7	A6	33 16½ 11
Passage walls between 3 and 4.			A6	33 16 10
Walls outside 2 and 3.	W 2 a	·7	A6	34 17½ 9 / 33½ 17 9
S. Passage.				
Wall at S.E. corner of 33.	W 1·5 a			
Buttress at N. end of passage.	B 1 a	·2–·7	B	29 14½ 8
Outside 18.	W 1 a			
Vaulting.	A 1 d	·5–2·0	B	26 26 7
Outside 19.	W 2 a	·2–·7	B	29 14½ 8
Vaulting outside 20.	" Buttress-vault "		B	
Outside 27–26.	W 2·5 a			
Between 26–25.	W 1·5 a	·4–·7	B	32 14 7
Outside 23.	W 1 a			
Passage near 33.		·5–2·0	B	32 15 7 / 33 15 6

PROVENANCE	BOND	INTERSTICES cm.	TYPE	SIZES OF BRICKS cm.		
Baqaria Tombs.						
2. Blocking.	Untypable		A6			
4. Blocking.	W 1 c		A6	30	14	10
6. Blocking.	W 1 c		A6	29½	14	6
7. Cross wall above.						
Three red-brick courses.	Untypable		B	30	15	9
Mud-brick courses above.	W 1 a	·7	A6	34	15	10
Blocking.	W 1a (var.)	·5	A6	34	16½	11
8. Blocking.	Stretchers		A6	33	16	10
9. Blocking.	W 0·5 ?		A6	33	16	10
11. Blocking. (Outer.)	Untypable		A6	31	14½	12
12. Blocking.	W 1 c		A6	31	13½	10
14. Blocking.	Irregular		A6	29	14	8
15. Blocking.	W 1 a		A6	30½	15	10
16. Blocking.	Untypable		A6	33	16½	10
17. Blocking.	,,		A6	32	14½	10
18. Blocking.		·3–·7	A6	29	14	7½
19. Walling.	W 1·5 a	·3–·7	B	32	15	7
Vaulting.	A 1 b	1·0–2·0	B	32	15	7
Blocking. Foundations.			B	31	15	7
Walling.			A6	29½	14½	9
20. Walling.	W 1 b1	1·0	B	28	12	6
Vaulting.	A 1 c	1·0–2·0	B	28	12	6
Blocking.	W 1 c	Dry-wall	B	29	14	7½
(Foundation of Blocking.)	W 1·5 e		B	,,	,,	,,
21. Walling. (Varying sizes.)	W 1 b		B	29	15	7½
22. Walling too destroyed for details.			B	31 28	15 14	8 8
23. Blocking. (Bonding not clear.)		·3–·7	A6	29	14	7½
24. Walling.	W 1 a	1·0	B	32	15	7
25. Walling. (Sixth course up all headers on edge.)	W 1 b	1·0	B	32	15	7
Vaulting.	A 1 b		B	32	15	7
Blocking.			A5	30	14	10
26. Walling.	W 1 a	1·0	B	29	14½	7
Vaulting.	A 1 b1	1·0	B	29	14½	7
27. Walling.	W 1 a	1·0	B	28	14	8
28. Walling.	Untypable	1·0	B	32	15	8(7½)
30. Pavement outside false door.		1·0–2·0	A5	32	17	12
Curved wall on pavement.	W 1 c		A5	29	14	7
False door.	Irregular		A5	32	17	12
31. Ramp.			B	29	14½	8
			A5	34	17	10
Outer wall. Lower against the rock.	W 1 a	0–·2	A5	33	16½	11
Upper.	W 1·5 a	0–·2	A5	33	16½	11
False door.		0–·2	A5	37	17	11
Internal vaulting over sarcophagus.						
Vault. Shaped bricks.	A 4 a		A5	35(32)	17	6
Sides.	W 3 ?		A5	33	16½	11
Ends.	W 1·5 a		A5			
External vaulting over sarcophagus.			A5	37	17	11(10)
Temenos Wall.						
(Bottom course headers on edge.)	W 2·5 a	·7	A5	32	17	10
	W 2·5 a	·7	A5	32	16½	10
At N.E. corner.	W 2·5 a	1·0	A5	33	17	11

CHAPTER V

SARCOPHAGI

In describing the sarcophagi it is necessary to ignore all consideration of date and to work upon typological grounds alone. An embarrassing feature of the chronology of the Bucheum is that the different sources of evidence appear at first sight to contradict one another. Even taken by themselves, ignoring all the other evidence, the sarcophagi do not show a steady development or degradation. It should be understood, therefore, that the type series on Pl. CXXII and the order of the following description are not necessarily related to the chronological order.

The drawings in the type series are isometric and schematic. Plans of all the sarcophagi excavated in the season 1929–30 and subsequently, and of one or two others are given on Pls. CXXII to CXXV. These are not referenced throughout the text. The photographic plates are numbers XXIV–XXVIII and XXXI. Individual references are given to these.

There are two main classes of sarcophagi, Monolithic and Polylithic, labelled M. and P. respectively. The subdivisions are as follows :

M.I. Rectangular, made of granite. The roof is trapezoidal with flattened sides.

M.II. ,, ,, ,, sandstone. Roof as above.

M.IIa. ,, ,, ,, ,, ,, ,, but having a rounded back to both sarcophagus and lid.

P.I. ,, ,, ,, ,, blocks. Well constructed and reasonably well finished. The roof is made of blocks which are placed transversely, flattened at their ends where they fit on to the sides, but arched over the sarcophagus. The front block has a false square façade, carved to resemble a doorway. There is no floor.

P.II. Similar construction, but more roughly made. There is no false façade and the roofing blocks are shaped in section as follows [redacted].

P.III. Again similar to the above, but very much rougher. Sometimes with a floor. The roof consists of plain slabs, often of irregular shape.

P.IV. Strictly speaking, this should not be included, as it is not a sarcophagus at all, rough roofing slabs being laid over a rectangular cutting in the rock.

There were also burials, two of them early in date, without any sarcophagus or stone roof.

In a strictly scientific classification M.I should not be in a separate class from M.II, the distinction being purely one of material, but the difference between cutting and polishing granite and cutting sandstone is so great that the latitude of making a separate class by reference to material seems justified. There are some minor differences among the examples of type M.II, not sufficient to justify separate classification, and these are mentioned below. There are strong reasons for including the rock-cut tomb with a stone slab roof among the sarcophagi as type P.IV. There were two types of burial without sarcophagi—the early type,

represented by Bucheum 16 and G, and Baqaria 33, and the late type, represented by Bucheum 9, 19, 20, 23, and, probably, 3, 4 and 5, and by all the Baqaria burials except 29, 30, 31 and 33. Though the two types differ widely they both have this in common, that there was no attempt to hide the absence of a sarcophagus, the bull being openly placed on the floor of a chamber. P.IV is a rectangular hole, the size and shape of a sarcophagus, cut in the floor of the chamber and roofed over with slabs like the other sarcophagi of its period. This could be disguised as a sarcophagus and it is possible that it was not made because of excessive poverty, but was a deliberate fraud on the part of the responsible officials. (Bucheum 17 is difficult to place; it may have had a lid and in that case be an example of P.IV.)

There is only one example of M.I, in Bucheum 10, Pl. XXIV, Fig. 5, and this can be dated with reasonable certainty to Nekhthorheb. This, the first burial of the Bucheum, was well supplied with funerary equipment, and was probably an imitation of the later Serapeum burials, which had granite sarcophagi. It is assumed (see p. 170) that the three burials without sarcophagi of the early type immediately follow this one.

The examples of M.II differ slightly. Bucheum 18 (Pl. XXVI, Figs. 1 and 2) is painted both on the roof and front. Bucheum M (Pl. XXVIII, Fig. 4) retains the projections at the top of each end of the lid, probably used in placing it in position. Bucheum H (Pl. XXVIII, Fig. 2) and 14 (Pl. XXV, Fig. 3) both have floors cut into an elaborate drainage system, which is probably an imitation of the stable in which the Buchis lived. The former is covered with stone slabs in place of the usual monolithic lid. It is possible that the original roof was removed from the Bucheum by robbers and the slabs substituted later, but, though we know that early sarcophagi were robbed during the occupation of the Bucheum, this is not a likely hypothesis, for such robbery was for valuables only, the robbery for stone belonging to a much later date. The most likely explanation of the missing lid is that it was lost in transit. Had it sunk in the Nile it would have been almost impossible to recover it.

The only example of M.IIa is in Baqaria 30 (Pl. XXXI, Fig. 3). If, as is argued on p. 175, this burial belonged to the mother of the Nekhthorheb bull, it may be that the curved end was originally made for a distinction between bull and cow burials and further information from the Serapeum would assist in judging whether this is so or not.

P.I has one very fine example in Bucheum 11 (Pl. XXV, Fig. 1). This, though less impressive than any of the monolithic type, is carefully made and has the further virtue of not being an inferior copy of earlier examples. Bucheum 7 and 8 (Pl. XXIV, Fig. 4) are inferior examples of this type which retain the flattened ends of the roofing blocks. Bucheum 12 and 13 (Pl. XXV, Fig. 2) have no flattened ends to the roofing blocks, but are otherwise of slightly superior workmanship. Bucheum 11 probably represents a renaissance during the Roman period (p. 173), this type continuing as long as sarcophagi were used, except for an interruption by P.II in burials O and N. (The sarcophagus plans show that there is a resemblance between the east ends of O and of 12 and 13; in all three it does not properly complete the rectangle of the sarcophagus.) According to this hypothesis, the remaining classes of the polylithic type must be regarded as decadent copies of M.II. (Bucheum E has curved roofing blocks, which are inexplicable.)

P.III comprises the remainder of the sarcophagi in the Bucheum, with the exception of that in K (Pl. XXVIII, Fig. 1), which is the solitary certain example of P.IV. Notable examples of P.III are those in: 15 (Pl. XXV, Fig. 4), which is made of thinner slabs than the

others, Bucheum A (Pl. XXVI, Fig. 3), which is very rough, and Bucheum B, which is the best-made example of this type and is shown (before opening) on Fig. 4 of the same plate. Bucheum D, which has two grooves cut in the floor (same plate, Figs. 5 and 6), possibly again in imitation of the stable drainage, also belongs to type P.III. There were blocks of stone in Bucheum L which indicate that it contained an example of this type of sarcophagi.

In dealing with the sarcophagi, mention must also be made of the demotic inscriptions upon the blocks in the polylithic type. These were of two main kinds, written and cut. The written inscriptions were always at the top left-hand corner of each block, but the chiselled examples were less systematically placed. P.I contained written inscriptions and in P.II and P.III they were cut.

With one exception all the graffiti appear to be directions for piecing together the sarcophagi, giving the number of the stone and the side of the tomb to which it belonged, the latter by the compass points. It is evident from tomb N that the builders were working by local North and South. In 11 the stones were numbered consecutively right round the tomb, so no compass directions were needed. Both in this and in N some otherwise unintelligible marks are probably mason's marks to differentiate the courses. One graffito appears to be a date—" Year 4, Phamenoth . . ."—though the reading is doubtful. This occurred underneath the south end of a roofing block in tomb N.

The only tomb in which the system of numbering and arranging the stones is clear is 11. In D it is particularly difficult to understand.

Unit of Measure. (In collaboration with C. A. Earnshaw.)

The early examples of sarcophagi, the M type, being well cut, appeared to be likely objects for investigating the units of length used in their construction. There are, however, more difficulties than are at first apparent. No two sarcophagi have, even approximately, the same dimensions, and it appears that the size was not fixed, or not rigidly adhered to. However, though this increases the difficulties, it does not prove that each individual sarcophagus was not measured and cut with care. Two methods of attack were used upon this problem. The first was the method given by Professor Petrie in *Inductive Metrology*, that of finding simple and likely ratios between the various lengths of the object. By this no satisfactory results were obtained. As a further check the empirical method of dividing by the most likely units was tried—a laborious process. In dividing any arbitrary length by a unit and taking the answer to the nearest number of units, it is obvious that the remainder cannot be greater than half that unit. Therefore, if a large series of purely arbitrary lengths be taken and divided by any unit to the nearest whole number of units, the arithmetical mean of the remainders will be close to one-quarter of the unit used as divisor. For example: if a series of arbitrary lengths be divided by 52·4cm. (the length of the Royal cubit to three figures) and the answer in each case taken to the nearest cubit, the mean of the remainders will be in the neighbourhood of 13·2cm. Therefore it is clear that if any satisfactory proof as to the unit used is to be obtained, the remainder must be smaller than one-quarter the length of that unit—in the example given 13cm. This method was tried, using more than a dozen different likely units, both large and small, with the result that in each case the remainder was just about a quarter the length of the unit. This does not prove that none of these units was used—any of them may have been—but if so the error of workmanship was too great for it to be possible to prove which was the unit in question.

This method has certain disadvantages, the worst of which is that it does not take into account the constant error arising from an inaccurate measure being used in the workshop, but it is a useful check in case the object may not have been made in simple proportions.

It having been found impossible to find the unit used in any of the Bucheum sarcophagi, it seemed probable that one of the sarcophagi of the Serapeum might prove to be of more accurate workmanship and therefore a better subject for examination. In *Le Sérapeum de Memphis*, on p. 113, Linant-Bey gives the dimensions of one of these sarcophagi, though he does not state which. An attempt was made to discover the unit used in its manufacture, but without success.

The probability is, therefore, that these objects are ametric, and were cut and ground according to the texture of the stone, till the necessary rectangularity was achieved. The workmen would obviously have to start by working to some suitable size, probably a round number of cubits, but unsuspected flaws in the stone would cause them to exceed this in certain directions, so as to facilitate the final polishing, and thus it would become impossible to detect the cubit originally used. It is, of course, feasible, with the aid of a set square, to cut out or grind down an object to a rectangular form without the use of a measure.

CHAPTER VI

MUMMIES

Evil circumstances of unusual strength and number combined to prevent us from obtaining much valuable information about the mummies. A number of tombs in the Bucheum are completely under water throughout the year, while most of the others, and fully half those in the Baqaria, are submerged during the period of high water. All the burials had suffered from damp, Baqaria 32 being least affected. White ants were plentiful in the Baqaria and frequently entirely demolished our survey pegs. The many robberies to which both cemeteries have been subjected were second only to water in their deadliness, by preventing the exact recording of the original lay-out of the bodies. One robbery took place within twenty-five years of the beginning of our work. In addition to these agents of destruction, the many salts present in the Egyptian soil seem to have worked with more than their usual vigour and effect. The poor quality soil in which the tombs were dug had collapsed frequently and large fragments from the roof had damaged many of the mummies.

The only fact that could be established about most of the mummies was that they had been fastened to something with bronze clamps (see pp. 103 and 106 and Pls. CLXII–CLXV). Though in a highly corroded form, in each burial fragments of some of these survived the various depredations. Where iron staples were used they were often found to have decayed to powder. With many mummies gold leaf, which originally covered the mask, was also found. Though the gold leaf was probably the chief concern of the robbers, they were not able to collect it all on account of its thinness, and it is almost certain that, in those burials which showed no trace of it, it had never been used. The remains of artificial eyes of varying substances were also frequent, but they might easily have been abstracted with the head, when the latter was taken out to be stripped of its gilding, so their absence in any particular burial does not prove that in that case they were not used. In one or two cases some solid remains of the board to which the mummy was fastened were found.

The better to preserve such evidence as there was, two mummies were waxed into solid lumps and removed entire (Baqaria 14 and Baqaria 7). The Baqaria suffered less from robbery than the Bucheum, a number of burials being untouched by the plunderers. A description of the process of waxing the mummies is given on p. 146. The mummy from 14 is in the Cairo Museum, and that from 7 in the Wellcome Historical Medical Museum. It was hoped to unwax the latter for examination before the publication of this book, but it is not available, owing to the transfer of the institution to its new quarters. Pl. VII shows a reconstructed life-size model of a Buchis mummy. The head of this was cast, painted and gilded by Mr. Stammwitz and his son, of the Natural History Museum, and we are very grateful to them for this valuable service. The binding of the mummy does not claim to be accurate, for reasons that are explained below. It is possible that the crown was really a miniature, like those

on the rams from Elephantine. A minor inaccuracy is that the uræi are shown as issuing from the horns, whereas they should, of course, be attached to the base of the sun disk.

Position.

Perhaps the best-preserved body of all, which was not found till the very end of the work, was Baqaria 32. This was taken to pieces very carefully, and every detail was recorded. Photographs of the various stages of cleaning can be seen on Pl. XXXIII. These photographs, together with the joined double photograph of 14, show the attitude of the mummy. The position will be seen to be not that of a resting ox, but that of a jackal or dog. To force the limbs into this position, it must have been necessary to cut the tendons. We are certain, from the skeleton of 32, discussed in Dr. Jackson's chapter on Osteology, that no bones were broken. Probably this is the operation under discussion on Pl. XII of *The Apis Papyrus* where it says : " This must be done by the Ritualist and the Lectors who sit before the ends. They must stretch them so that its bones are not crushed. They must cover his bones at his haunch and foot with cloth. . . ." The tail was passed under the right hind-leg. Some examples have the hind-leg extended and in others they are crouched, but this variation does not appear to be due to a difference in date. The head was supported in position by a wooden chin rest and by an ordinary wooden pillow, such as was used in life by human beings. The chin rest and pillow may be seen in the photograph of 14 and also in the drawing on Pl. CXVI. There was no chin rest in 32, but Fig. 5 of Pl. XXXIII shows the pillow after removal of the skull. On Pl. XI of *The Apis Papyrus* mention is made of the great and little head rests, which these undoubtedly are. The mummy was almost always held to a board by iron or, more usually, bronze clamps.

The Board.[1]

The board was found mostly as powder, partly owing to the activities of white ants, and partly owing to the damp. In no case were we able to obtain the exact thickness of the planks used. However, when the mummy of Baqaria 14 is unwaxed it may be possible to establish this measurement definitely ; it appears to be about 2·5cm. in this example. Iron nails were certainly used in the construction of the board. The board from 14 appears to have been constructed from eight planks, approximately 11cm. in width, the total width being 87cm. The only plank of which we could obtain the exact measurement was 11cm. wide, which confirms the above calculation. In 32 the board was two, or more probably four, planks in width and, as the total width of the mummy was 1·40m., this gives a width of 35cm. for each plank, assuming four planks were used.

The length of the board of 14 is about 2·28m.

At the beginning of Pl. XI of *The Apis Papyrus* Prof. Griffith has translated : " A bolt (or plank), four and a third Divine cubits long (other reading, two and a third), width one and two-thirds Divine cubits. A *Sšm* with 22 clamps ; four rectangular blocks of stone. . . ." If we divide the length and breadth of the board of Baqaria 14 by the dimensions specified, we obtain cubits of 52·7cm. and 52·5cm. respectively, a result very close to the Royal cubit, considering

[1] The word used in *The Apis Papyrus* for the wooden construction to which the mummy was attached by winding bandages through bronze clamps is variously translated as " board," " bolt," or " plank." (The bier is an entirely different object used for carrying the mummy to the grave.) Here we have used the word " board " to signify the whole object, and plank for the separate pieces of wood of which it was made. There is no English word having the exact significance required here.

the material. The width of the board of Baqaria 32 is two and two-thirds Royal cubits of 52·5cm. If the estimate of the numbers of planks is correct, the carpenters would thus have been using a Royal cubit of about 52·5cm. divided into six palms for taking the overall measurements, and divided binarily for the individual planks. This seems to be an awkward arrangement, though a Royal cubit in the Cairo Museum (1931–149), Ptolemaic, from Denderah, is divided binarily and duodecimally, as well as decimally and into seven palms.

None of the specimens of wood from the burials we excavated was in sufficiently good condition for botanical examination, but a piece of wood was found in the bay leading to burials 1–5 in the Bucheum, which almost certainly belonged to one of these boards. According to Prof. Troup it is true cedar.

The Clamps.[1]

These were found in practically every burial. (For analyses see pp. 106 and 113.) Baqaria 10 had only two iron clamps, one each side of the head, and Baqaria 29, which will be discussed separately, had none. The method of using these is best understood from the drawings on Pls. CLXII to CLXV. The untouched burials had usually between twenty-one and twenty-three clamps, twenty-two being specified in *The Apis Papyrus*. (See above.)

The clamps were not placed over the limbs of the bull, but on each side of them, so that the bandages, passing through the clamps and over the limbs, held the latter down to the board. There is an exception to this in Baqaria 17, where clamp M passes over the forelimb, but this appears to be the only example. We endeavoured to give the same letter to clamps in the same relative position in different burials, but this was not always possible, owing to collapse, disturbance, and lack of uniformity in the original work. It will be seen, however, that the irregularities were not great, and considering the lapses of time between burials, it seems reasonable to suppose that written instructions were being followed. Possibly these, or similar instructions, were contained in the missing portions of *The Apis Papyrus*. There is no complete Apis mummy in existence, and M. Daressy does not report the position of any of the clamps in his account of the tomb of Mnevis, but the various mummies of sacred (but not divine) bulls, from Abousir and Saqqarah, appear to have these clamps. Some photographs of the latter mummies are shown on Pl. CXI.

The hindquarters and body of the bull were obviously held by bandages passing right across the mummy, either one bandage running through one pair of clamps and then diagonally to the next, or a separate bandage for each pair. Imprints and fragments of linen were occasionally found underneath the remains of the board, but they were insufficient to show that the bandages enveloped the latter completely. It seems more probable that a general shroud enveloped all. Moreover, clamps would hardly have been necessary if the bandages went round the board. It is clear that in most cases there were two pairs of clamps holding the forelegs (see A B, E F, G H and I J in Baqaria 3). The use of four clamps, I2, H2, and K and L, is obscure. These can be best seen in Baqaria 23. That they served some function in fixing the position of the head is clear

[1] " Clamp " is a rather better word for these objects than " staple " on account of the points of the object being bent over. The definitions of the two words from the Oxford English Dictionary are as follows :—

Clamp. A brace, clasp or band, usually of iron or other rigid material, used for giving strength or support to flexible or movable objects or for fastening two or more things securely together.

Staple. A short rod or bar of iron or other metal bent into the form of a U or of three sides of a rectangle, and pointed at the ends, to be driven into a post, plank, wall or other surface, in order to serve as a hold for a hasp, hook or bolt to secure a door or box, or as an attachment for a rope or the like.

and they would serve this function well if the bandage passed through I2, over the right horn to K, across the neck to L, and back over the left horn to H2, thus holding the head on to its supports of pillow and chin rest. Yet this is not an altogether satisfactory explanation, since it would be expected that I2 and H2 would be placed latitudinally for this purpose, unless the intention was to turn a continuous bandage so that it could pass also through G H and I J. It is quite probable that W and X were also used in supporting the head, the bandage running the length of the bull's body. If it were desired to give an upward pull by using W and X, then it would have been necessary to omit I2 and H2, running the bandage from W to K, over the horn and back again. A bandage through G H, H2, over the front of the face, through I2, I J, would correct the tendency of the former bandage to throw the nose in the air.

The Munich bull, which is the best preserved of the sacred bulls, shows no such bandages from the horns to the hindquarters as suggested, but this bull has the forelegs folded under it. The possibility that L K and I2, H2, were concerned with holding the pillow in position must not be ignored, particularly considering Baqaria 32, where they appear to serve this purpose, though in Baqaria 14 there was evidence to show that the pillow base had been nailed to the board.

The question arises of how much of the bandaging of the mummy was done after the bull was placed on the board. The clamps were frequently embedded deeply in decayed linen and they were not visible in the mummy of 7, except as bulges under the linen. On the other hand, linen was found between the skeleton of the bull and the board which would have had to have been wrapped on the mummy before placing it on the board. If the gilded stucco were applied to the head before the latter was finally settled in position, there would be a danger of the stucco cracking, but, if the application were left till the body was in position, the bandages which held the head to the clamps would interfere with the plastering and gilding.

All linen was far too decayed to be able to discover the actual bandages, though in Baqaria 32 the width of the bandages was apparently 5cm.

Reference to the section on bandaging in *The Apis Papyrus* (Pl. XII) was only made *after* the above had been written, and the above hypothesis has been left unaltered to show the remarkably close correspondence between the two sources of information. The following is the relevant extract from *The Apis Papyrus*, with parallel references to the lettering of the staples used in the Bucheum. The paragraphs are arbitrary and have been made for convenience of commentary.

" They must anoint the god with ointment and let him lie on the board while a basis of four stones is under the god.

This board is made of several planks. The mummy was permanently attached to it by means of the clamps. The " basis of four stones " was presumably a stand to facilitate taking some of the wrappings underneath the board.

" They must cause the *skr*-cloth to go under the god.

Between the mummy and the board.

" They must put a great support under the breast and a little one under the head and must make the board fast in front and behind.

A pillow was found under the breast and a small block under the chin, described by us as a chin rest.

Either making the planks fast together, or fastening the rests to the board ; probably the latter.

" They must overlay the middle with *nbtỉ*-bandages and the *mtr.* cover. They must tie it with a *sbn* bandage from front to back and *vice-versa*. They must again knot the *skr*-stuff from outside under the god as it is outside. They must lay them right and left of it as they wish. They must lay a linen cloth on the god in front and behind.

These directions seem to refer to covering the mummy with some preliminary wrappings before the process of bandaging it to the board by use of clamps began. The *skr*-stuff may have been to hold the mummy firmly enough to make the bandaging possible. Perhaps this passed under the board.

" They must set the god on the bed with bandages. (Described above *nbtỉ*.)

Probably only recapitulation of the fact that the mummy and bandages must be made ready.

[Space.] " The method of sm'r. They must bring the *nbtỉ* bandages of 120 cubits.

" They must bring them down from outside to the clamps (?), which are under the coffin (?), over his feet from the front, and divide them into two parts so that there are 60 divine cubits to the left and 60 divine cubits to the right. They must fix them fast. They must bring them to the upper side of his shoulder. They must take the *nbtỉ*-bandages right and left.

sm'r : bandaging the mummy to the board.

This is obscure. Under the coffin is nonsense. There were no clamps under the board, but the bandages may first have been fastened to the bent-over points of the clamps in that position. This would bring them " over his feet from the front " as required. Either the bandage split up the middle or simply two bandages for use on alternate sides of the body. When securely fastened they were taken up over the shoulders, probably through K and L (Pl. CXVI, Baqaria 23.)

It is not certain whether from here, onwards, two sets of bandages are being referred to. The two which started from the front, and two used transversely, or only the former set. Assuming the latter, they are next taken ; the right to O, Q, etc., the left to P, R, etc. (Pl. CXVI, Baqaria 14.)

" They must take them to the other clamps at the back.

They continued transversely Q, S, U, W ; and R, T, V, X, W and X being the clamps referred to. (Same fig.)

" They must draw them over the middle of the body and they must draw them to the *nbtỉ*-bandages which come from the front. . . .

The bandages are taken straight back and probably passed underneath the first layer where this came over the shoulders from the front.

" They must fix the two *nbtỉ*-bandages to the two clamps which are in the middle of the ground (*t*?) in front.

These two clamps are probably C and D.

" They must take them over the back and to the two clamps from behind.

They are now taken round the back of the neck to brace the head to the rests and returned to one of the following pairs of clamps : N, M ; K, L ; I2, H2 ; and C, D ; probably the first-named.

" They must take the *nbtỉ*-cloth from right to left and left to right and make it fast.

Another zigzag traverse, the length of the body. The bandages being fastened to W and X.

" They must draw them to the two front clamps and make them fast.

They are brought back to C and D again.

" They must bring them out between the horns.

Probably taken up via H2 and I2, to get greater tension and to avoid covering the face.

" They must take the two *nbtỉ*-bandages from left to right and right to left. They must bring them to the two clamps of the rest which is before the god.

Probably taken over the head between the horns and back down to K and L, but possibly a double traverse taking in M and N.

" They must bring them on the . . . They must work the *nbtỉ*-cloth from right to left and left to right. They must make them fast so that the head is given its proper shape. The remainder of the *nbtỉ*-bandages . . . If they are taken to the two clamps they must complete the god altogether arranged for the second time.

This might refer merely to traversing round outside the head between M, N, and K, L, or I2, H2 ; but possibly a complete rebandaging of the body in the zigzag method mentioned, finishing at the head.

" They must bring another *nbtỉ*-bandage and divide it as they wish. They must make the feet and legs fast to their clamps on the board. They must lay a linen cloth over the god. They must make the *skr*-stuff go under the board. It must be two palms in breadth. They must three times wrap it to the upper side of the god before and behind the navel. They must complete 3 *nm* from them.

These two clamps are almost certainly W and X or C and D.

" The Lector-priests and priests must stand before the god and make him rest on the supports.

The forelegs are bandaged with separate bandages through the clamps A, B ; E, F ; G, H ; and I, J. (See Pl. CXVI, Baqaria 14.)

[Space.] " They must do all this while the father and the prophets stand there before the cloth is cut up. When the stuff is cut they must raise a lamentation. They must bring the bier before the god and make him rest thereon.

A shroud of some sort covering the whole mummy and passing under the board.

" They must . . . behind the coffin. They must make the god rest in the coffin and make fast the *ḏd* pillar before and behind the coffin. They must equip him with a linen cloth and a bandage. They must take a veil of red linen for him. They must bind an *ỉsh* on him. They must make *mtr*-cloth and ointment for him.

It is not at all clear what these supports are. The bier is mentioned below.

" They must take the cord out of the clamps of the coffin."

This is unintelligible.

To carry him to place him in the coffin. The bier is differentiated from the wooden board to which the mummy is attached

From this it is apparent that the mummy was lowered into the coffin by means of ropes passing through the clamps. " Clamps of the coffin " is meaningless.

The Mummy Wrappings.—The wrapping of the mummy itself was an intricate and lengthy process, as may be seen from an examination of *The Apis Papyrus* (Pl. XI). Of the method of wrapping it was possible to discover but little, owing to the decayed state of the material. In Baqaria 32 Fairman noted three layers of linen, graduating from coarse to fine inwards. It was clear from the same burial that layers of linen, plaster, resin and even gold leaf were superimposed on the head. Also that a shroud of some sort enveloped the whole of the mummy and the bier.

From the specialised report on the textiles by Mr. Midgley, it is evident that the textiles are identical with samples from the Badarian, predynastic and protodynastic periods. Two alternative explanations of this fact are possible. Either the early types of linen were retained for the most important religious usages, such as the burial of a god or a king, or they survived for general use in this particular district. There are objections to both hypotheses. There is little to support the former in the evidence of other crafts in relation to temples and royal burials, except the use of flint knives in mummification, and little that favours the latter in the evidence of other crafts from this district.

In *The Apis Papyrus* special fabrics are specified, but unfortunately at the time when the papyrus was translated, it was not possible to translate the adjectives which qualify the different bandages and it is uncertain if the descriptions refer to the method of manufacture.

In the demotic ostraka mention is made of at least two different weavers, one a Greek weaver and another " the weaver of royal linen," and it seems to be at least a possibility that this refers to a craftsman who specialised in producing this early type of textile.

In *The Literature of the Ancient Egyptians* by A. Erman (trans. Blackman), p. 244, the lover says, speaking of his beloved to her handmaiden: " Put the finest linen between her limbs, make not her bed with royal linen and beware of white linen." Erman comments : " These must be inferior sorts of linen, anyhow at this period." But on the previous page the maiden says : " My brother, it is pleasant to go to the (pond) in order to bathe me in thy presence, that I may let thee see my beauty in my tunic of finest royal linen, when it is wet. . . ." Accepting the implication that royal linen was inferior, there are two possible explanations of the maiden's wish ; either the linen, though inferior, was more transparent, or more clinging than other kinds, or it was specifically used for bathing-dresses.

In the abdominal regions of one or two of the less decayed mummies of cows was found a quantity of crumbly brown matter. Under a magnifying glass this had every appearance of being remains of a vegetable nature, and was probably the contents of the alimentary canal. Unfortunately no specimen of this was examined for the presence of embalming materials. This substance shows that the entrails were not extracted at mummification, a hypothesis that is further confirmed by the absence of any canopic jars and of any decayed matter in the pottery.

It is evident from the above and from *The Apis Papyrus* that at this date the bull was not eviscerated, but that such treatment of the entrails as was made was done through the anus. The appropriate section in *The Apis Papyrus* (middle of Pl. XII) reads as follows :

" A lector goes before the anus. He must lay a cloth over himself and the god. He must take the cloth and all things that he finds there as far as his hand can go. He must wash it with water and he must stuff it well with cloth. He must lay out the stuff and the wrapping which the five priests, who are in the ship, have taken, and which contains the things of the anus. He must anoint them with ointment and wrap them in cloth [space]. Another lector goes before

the wrapping. He must anoint it with ointment and cover it with a cover which is soaked in ointment. He must bind it with a bandage. He must cover it with more cloth. He must put five bandages over it and three under it. He must equip it therewith. He must wrap it. He must cause them to go to the Right Bone. They must stay thereon. They must lay the cloth from the forepart backwards and bind it up with that from the rear. They must bring the *wꜥw* out from it. They must wrap the back with *str*-cloth and *vice-versa*."

There is considerable authority for this method of mummification. The method is described by Herodotus (II, 85–88). The following is quoted from p. 58 of *Egyptian Mummies*, by G. Elliott Smith and Warren Dawson, and is the authors' translation :

" For those who desire the medium type to avoid heavy expense, they prepare the corpse thus : Having charged the syringes with cedar oil, they fill the inside of the corpse, without making any incision or removing the viscera, but inject it at the anus. They then close the aperture to prevent the liquid from escaping and soak the body in natron for the prescribed number of days. On the last day they let out the cedar oil which had been previously injected, and such is its potency that it brings away the bowels and internal parts in a fluid state, and the natron dissolves the flesh so that nothing remains but skin and bones. When this has been done they return the body without further manipulation."

On p. 79 of the same work the authors say, in reference to mummies of princesses found at Deir el Bahari :

" Unfortunately no exact data are yet available as to the technique adopted ; but we understand that in some cases at least, no embalming wound was found in either flank, or in fact elsewhere. The preservation of the body seems to have been effected by a process mentioned by Herodotus. Resinous material was injected into the alimentary canal *per anum*."

And again on p. 125, with reference to Ptolemaic mummies from Nubia :

" In one case, although there was no embalming wound, the whole of the viscera had been removed ; this could only have been done through the anus, and corresponds to the second method of Herodotus. . . ."

There is, therefore, ample evidence for the use of this method of embalming in Ancient Egypt.

The ostraka (Vol. II, pp. 53–55) show that natron, myrrh and incense were used for the mummification of Buchis and there is similar evidence from *The Apis Papyrus*, though, unfortunately, in the version available the ingredients used in washing the internal organs are not mentioned. Mr. Lucas, on *The Use of Natron in Mummification* in *J.E.A.*, Vol. XVIII, p. 125, says :

" There is no evidence that soaking the body in a bath or solution played any part in the ancient Egyptian method of mummification, and there is a considerable amount of evidence to the contrary.

" There is abundant evidence that the body was treated by means of a dehydrating agent, and since, as a result of this treatment, it would have become thoroughly desiccated, there was no further need for drying."

He mentions the fact of a body being washed with natron solution and quotes Blackman to this effect (*Rec. de trav.*, Vol. XXXIX, p. 53 ; *Ency. of Religion and Ethics*, Vol. X, p. 476). Also in referring to specimens of brain and resin impregnated with natron he says that " the resin may have become contaminated by coming into contact with solid natron, either accidentally or intentionally, during the embalming process."

The evidence from the Bucheum is mainly negative, for there is no evidence whether the body was soaked in a bath or not. On the other hand *The Apis Papyrus* shows clearly that a bath was not used. There is no evidence for packing the body in dry natron. The brief mention of this part of the process in the second account of *The Apis Papyrus* gives some reason to suppose that the viscera were packed with solid material as well as being washed. The passage from Pl. XVI is very fragmentary in Spiegelberg's translation, where it reads as follows : " He must one (*hin ?*) . . . natron, myrrh, in a cloth. He must wrap it in a bandage as a bundle. He must use the best of the stuff for the anus until he has stuffed it tight.[1] The ritual leader and the . . . must use the best of the stuff for the anus until he has stuffed it tight. Thereafter must the lector, who is before . . . 6 (?) bundles of salt (?) . . . what he is in the . . . of the god, which is filled with natron and cedar oil. He must . . . with fresh incense at the opening of the above place. Thereafter must the . . . the cloth . . . in his hand . . . after he has given it *sḏ*-stuff, pure oil, another reading, oil, natron." Further on occurs the phrase : " They must wrap him with a cloth soaked in oil and natron." The latter phrase hardly seems to cover a desiccating process. We have seen that Lucas is of the opinion that the natron and resin may have come into contact either intentionally or accidentally during the embalming process. There seems to be clear evidence here that the mixing was intentional.

The strongest and most interesting piece of evidence found by us was the four bronze objects described as an enema, a douche, and two vaginal retractors. In Chap. XII, on pp. 100–102, the evidence is given in relation to these instruments and also some suggestions as to their application.

In the cow of burial 32 Fairman found in the thoracic cavity a dark resinous material, of narrow extent which began at the base of the throat as if it had been poured in by a funnel through the mouth. In *The Apis Papyrus*, Pl. XVII, Col. b, at the beginning : " See the use of the ingredients . . ." below : " Thereafter must they bring the warm and cold ingredients which are in the two ointment pots of gold, and the pure *ʾnd* oil, and the *shi* . . ." again : " The warm ingredients are for his tongue " and again : " He must pour the warm ingredients over the above-mentioned tongue."

It is worth noticing the uses described for some of the pots in *The Apis Papyrus* list, given in full on p. 87. Into E is poured the water that was in the entrails ; into F " what was in the entrails, water and oil, each having a part of the purification in it." Into H they press the water with which the entrails were purified. U are " great pots wherein to do the Horus copper while they are filled with pitch." This probably means that they hold the pitch for filling the Horus copper (i.e. the enema referred to above).

Decoration.—The decoration consisted of three main features—the mask, the eyes and the crown.

The mask was made of one or more layers of plaster covered with gold leaf. Sometimes linen, coated with resinous or bituminous material, covered this mask, and in one case at least a layer of gold leaf on plaster was covered with this saturated linen and another layer of gold leaf on plaster was superimposed upon it. It is uncertain how much of the neck and shoulders was covered by the mask. The gold leaf had from 10–20 per cent of alloy, was ·0005in. thick and

[1] Prof. McCunn tells me that to-day when animals are mummified the orifices are packed with cottonwool soaked in formalin.

was applied with white of egg. For analyses of gold see p. 109, analyses of adhesive and plaster, pp. 68–69.

The Eyes were a frequent, but not invariable, feature of the mummies. It seems probable that where none was found the eye had been indicated by painting on the linen or plaster of the mask, as can be seen on the so-called Apis head in the Louvre, Pl. CXI, Fig. 4[1]. Owing to the poor condition of the mummies there is no evidence of this practice from Armant.

The purpose of the eyes was to enable the mummy to see and to make it appear more lifelike.

Two main periods are observable in the eyes—the earlier (types I–V), in which the eye and surround were made of stone and copper respectively, and the later, in which both were of glass. Type VI is transitional, the eye being of glass and the surround of copper.

Photographs of a number of the eyes are on Pl. XXXVI and drawings on Pls. CXVIII to CXX in tomb series. In addition to these a type series of eight types and one sub-type is illustrated on Pls. CXXI and CXXII. Many of the eyes were in bad condition and in some cases the glass had decayed and fractured into splinters. These had to be waxed into a solid block and cleaned when they were brought home.

The type series shows evolution and decadence, but these do not agree in every case with the chronology as adduced from other evidence. The eyes are arranged in purely typological order and the problems of dating are dealt with on pp. 170–178, in the chapter (XX) dealing with the chronology of the tombs.

The first type is crude and probably had no surround. The pupil and iris are represented in one piece[2], which must have been inserted with a thick layer of adhesive, since the bed for it is extremely rough. In the British Museum a reconstructed eye of similar type shows a copper disk between the pupil and the base.

In the second type the ends have been cut away to allow for the insertion of pieces to represent the canthi, which are so prominent in a bull's eye. The canthi disappear until type VI, apparently a retrogression, but see the note about dating below. There was apparently a surround to this type.

Both in technique and natural representation there was a great advance in the third type. The backing of the eye, which also represented the white, was well cut and smoothly ground, and the pupil was keyed into a slot at the top of it. The pupil fitted smoothly into its socket, and may even have been ground in. A copper disk, similar to the British Museum specimen referred to above, was found near the head in Baqaria 33, but the grinding-in of the pupil into its socket shows that the disk could not have been used in this case, as in the British Museum reconstruction. (For analysis of the copper surround from Baqaria 33 see p. 108 and for analyses of other portions of eyes, pp. 69–71.)

Type IV shows a saving of labour and trouble by making the pupil itself the basis of the eye and grinding out the corners to insert the whites.

In type V a further simplification was effected in the surround and in the eye itself. The use of a bronze pin to hold the eye into its socket made it unnecessary to give so much holding

[1] Also published in *La Faune Momifiée*, Lortet & Gaillaud, Lyon, 1903, fig. 35, p. 56.

[2] This practice was continued throughout the series and the section is referred to as the pupil. In cattle the difference between the iris and the pupil is not easily seen.

power to the surround itself, while by curving the upper surface of the backing a great saving was made in the labour of manufacture.

In type VI glass is used for the body of the eye, and the canthi reappear. The bronze surround was also further simplified.

In type VII the best effect was achieved. The surround was made of blue glass and the whole object must have had a brilliant effect, though now dulled by patination. Nevertheless decadence had set in. The pupil had become only a thin layer of glass over adhesive (see analysis p. 70). In this and subsequent types the bronze pin, when used, can have added but little to the strength of the object, for it merely passed through the adhesive and was fastened insecurely into the glass surround without giving adequate support. It is possible that the hollow beneath the pupil was used to form a mortise and tenon joint with the mummy. Nevertheless, examples of type VII have stood the test of time well, though this may be due to the conditions of the burials in which they occurred.

Type VIII has a slightly deeper pupil. There is no apparent method of attaching the canthi or the surround, and in no case were these found. It is possible that surrounds were no longer made ; perhaps linen was sewn round as in the Louvre head. This type is apparently intrusive in the series, and may well be a renaissance, following IX and X.

Type IX, almost certainly without a surround, is a more logical development from VII than it is from VIII, or than VIII is from VII, though the difference between IX and VII is greater than would be expected in consecutive types.

Setting aside the examples where the eye was probably paint only, type X shows the lowest stage of decadence. The eye was a plain piece of glass with a black pupil roughly painted on the centre.

The occurrence of type II is difficult to explain. Only one example of this was found (by Dr. Frankfort) with burial 19. The burial was disturbed and it is therefore not altogether certain that the eye belonged to it. The burial is a late insertion in the passage, dated to Probus, whereas the eye has been placed in the type series immediately after I, as that is the only type which it resembles. The only internal evidence against its belonging to the early period is the presence of slots for the canthi, which do not reappear till type VI. It is possible that the eye was a reused example, or represents an unexpected renaissance.

The eye from the mask which stood on the stela of Bucheum B has been omitted from the types because it stands outside the series. It is worth noting that it is made of stone and therefore confirms the attribution of the large eye of stone found above B to this burial.

The following is a list of the examples found, with their materials, types and present distribution :

Provenance	*Materials*					*Type*	*Distribution List*
Bucheum.	White	Canthi	Pupil	Surround.	Pin		
1–5	We. Gs.	?	?	?	?	VIII[1]	Bolton
2	?	?	Bk. Gs.	?	?	,,	B.M. 59519
10	Lstne.	—	?	—?	—	I	,, 59515
18	,,	—	?	?	—	III	,, 59516
19 ?	,,	?	?	?	—	II	,, 59517
22	We. Gs.	Rd Gs.	Bk. Gs.	—	Æ	IX[1]	,, 59514
B	Lstne.	—	Obsdn.	Æ	,,	III	W.H.M.M.
B Mask	,,	—	,,	?	—	—	,,

Provenance	*Materials*					*Type*	*Distribution List*
Bucheum.	White	Canthi	Pupil	Surround.	Pin		
C	We. Gs.	Rd. Gs.	Bk. Gs.	?	Æ	VI	W.H.M.M.
G	Lstne?	—	Obsdn.	Æ	,,	IV	Cairo 55623
M	Chert.	—	?	?	—	III	Toronto
X	?	?	Bk. Gs.	?	?	VII?	B.M. 59518
,, Model ?	?	?	Rd. Gs.	—	?	IX?[1]	,, 59520
,, Model or	?	?	,,	?	?	?	,, 59521
,, frags. in-	?	?	Bk. Gs.	?	?	?	,, 59522
,, lay.	?	?	Yw. Gs.	?	?	?	,, 59523
Baqaria							
6	We. Gs.	Rd. Gs.	Bk. Gs.	Be. Gs.	—	VII	Cairo 55624
8	Ivory	—	Obsdn.	?	Æ	V	Toronto
9	Clear Glass		Bk. Paint	—	--	X	W.H.M.M.
14	We. Gs.	Rd. Gs.	Bk. Gs.	?	—	VII	Bolton
17	,,	,,	,,	Be. Gs.	Æ	VI	Manchester
18	,,	,,	,,	—	—	IX[1]	Bolton
19	,,	,,	,,	—	—	,,	W.H.M.M.
20	,,	?	,,	—	—	,,	Bolton
22	,,	?	,,	?	—	VIII[1]	Brussels
23	,,	Rd. Gs.	,,	—	—	IX[1]	Manchester
25	,,	,,	,,	—	—	,,	Bolton
30	Lstne.	?	?	?	—	I	B.M. ?
32	We. Gs.	Rd. Gs.	Bk. Gs.	Be. Gs.	—	VII	Bolton
33	Lstne.	—	Obsdn.	Æ	—	III[1]	,,
Baqaria Roman Village ...	?	?	Bk. Gs.	?	?	IX[1]?	,,

In addition to the above, three eyes were found by Dr. Frankfort, which we have been unable to trace. No drawings or photographs were made at the time, but the following information is taken from Dr. Frankfort's diary :

Bucheum 11. " Eye socket."
,, 8. " Eye of blue limestone, red glaze and white limestone (?) "
(This was probably a glass eye of types VII–IX.)
,, 12. " Remains of an eye."

The Crown.—Many strips of coloured glass were found near the head of the mummy in several burials. These were usually blue, but in Bucheum 22, the second bull of Augustus, they were red. They belonged to the ceremonial crown affixed to the head of the mummy, the design of which can be determined from the reliefs on the stelæ. The crown worn by the living Buchis is represented on the stelæ and it is uncertain whether the mummy wore a crown of the same size, or smaller, like those found on the sacred rams at Elephantine. It is possible that the artist drew the crown on the living bull bigger than its natural size for purely artistic reasons. In the reconstructed mummy (Pl. VII) the crown is the same size as that shown in the stelæ. The uræi are there attached to the horns, but it is more probable that they were attached to the base of the sun disk. Pl. LXXXIX, Fig. 5, shows pieces of inlay arranged roughly in the relative positions they would have occupied in the crown. These fragments, now in the British Museum, were found by Dr. Frankfort in the neighbourhood of the Probus burial (Bucheum 19). From the absence in all cases of any other material than glass inlay and gold leaf, it may be assumed that the body of the crown was made of wood and was covered with gold leaf. The small spade-shaped piece of red glass inlay at the bottom of this photograph may

[1] In type VIII the white, and all parts of type IX, are not glass, but an opaque material, an analysis of which is on p. 70.

be from the uræus, but a similar fragment of the same size was found in the debris of the mask near the stela of the first Augustus bull (Bucheum B).

Other Mummies of Oxen.—Pl. CXI shows mummies of oxen from several museums. Figs. 1 and 2 illustrate the bull in the Munich museum. The history of this mummy is obscure. It was presented to Munich in 1870 by a doctor of the Egyptian court and is alleged to have come from the Serapeum. Fig. 3 is one of the three mummies in the New York Historical Museum. It comes from the Abbott collection, bought by New York during the last century. Mr. Abbott was British Consul in Egypt and stated that the mummies came from Dahshur. Fig. 4 is the alleged Apis head in the Louvre, already referred to. Fig. 5 shows the two mummies in the Vienna Natural History Museum.

It is a matter of some doubt whether any or all of these mummies come from the Serapeum, as is generally supposed. There is no evidence how the mummies of Apis were decorated in the late period, but it is unlikely that Apis would have been treated less well than Buchis. The poverty and lack of decoration on these mummies strongly suggest that they come from ceremonial burials of animals in the neighbourhood of the Serapeum rather than from the Serapeum or the burials of the mothers of Apis. The New York specimen has a stone or glass eye, and judging by the photograph there is a similar object under the outer wrappings of the Munich mummy also.

ANALYSES

Examination of the Gold on Plaster from the samples marked Bucheum H

By A. P. Laurie

Underneath the gold and on the plaster, there is a yellowish brown layer resembling yellow ochre and corresponding with the layer of bole which is laid under gold leaf to make a smooth surface.

When the underlying plaster along with the yellow layer is treated with an acid, it dissolves with effervescence. The solution contains undissolved coarse translucent yellow particles, evidently fragments of the upper layer, and coarse transparent particles which show the chromatic colours of quartz in the polarised light. If the solution has a little dilute sulphuric acid added to it, the characteristic crystals of sulphate of lime are formed.

This is evidently a lime sand plaster. A test for sulphates gave a negative result, showing that no plaster of Paris is present.

The yellow fragments, when heated strongly, turn red, and when warmed with strong hydrochloric acid are partially dissolved, the solution giving the Prussian blue reaction. This layer evidently consists of a yellow ochre, probably of a texture similar to bole.

During these experiments no indication of a soluble gum or glue was seen, which, when present, forms an outer ring on evaporation of the solution, which is soluble in hot water.

Presence of Organic Matter.

The layer under the gold was scraped off for examination.

A portion moistened with strong sulphuric acid, heated over the flame till the sulphuric

acid was driven off, and again moistened with acid, charred, showing the presence of organic matter.

The plaster treated in the same way showed no sign of organic matter being present.

Another portion was treated with bisulphide of carbon to dissolve beeswax if present. Nothing was extracted.

Some of the upper layer was mixed with soda lime in a tiny quartz glass capsule, and the capsule closed with a cover glass, to the under surface of which a fragment of moist neutral litmus paper was attached. The capsule, having been pushed through a hole in an asbestos sheet, was heated by a tiny spirit lamp flame from below. The litmus turned blue, indicating the presence of ammonia.

This was confirmed by repeating the experiment with a cover glass moistened with platinic chloride. The characteristic yellow crystals of the double ammonium salt were obtained. The cementing material is therefore a nitrogenous body.

It therefore may be either glue, casein, white of egg, or yolk of egg.

A little of the material under the gold was taken up with caustic soda from sodium on a tiny platinum spatula, the mass fused in a spirit lamp flame, crushed on a clean piece of silver, and moistened with dilute hydrochloric acid. The silver showed a slight brown stain, showing the presence of sulphur and therefore eliminating glue.

Both casein and yolk of egg contain phosphorus, but white of egg does not. Another portion was therefore fused with potassium nitrate, dissolved in strong nitric acid, and a drop of molybdate of ammonia solution placed on the glass slide, the two drops being brought into contact. No yellow precipitate was formed, showing the absence of a phosphate. A check test was made with a little of the plaster, mixed with a tiny particle of casein, and the yellow precipitate was at once obtained. We therefore are justified in saying that the gold has been cemented on with white of egg.

The Plaster from the Masks from Bucheum H, Baqaria 7 and Baqaria 19

By A. F. Hallimond

The plaster is a loose aggregate of minute crystalline grains of calcium carbonate. The silica content seems to be low, but there is some finely divided quartz. All three samples are the same ; they appear to be a very simple lime mortar.

The Remains of the Eye Pupils from Baqaria 33

By D. L. Reynolds

The material from the pupil of the eye is friable and yellow in colour, due to weathering. After treatment with H Cl, microscopic examination reveals the fact that it is composed of a faintly yellow substance with a refractive index $> 1{\cdot}514$ and $< 1{\cdot}522$. In part it is isotropic, but in places shows a fibrous texture and a low bi-refringence. It resembles palagonite and is probably the product of weathering of a rock glass.

[This was a crumbly yellow substance, appearing to the naked eye like a plaster or other adhesive. At Prof. Laurie's suggestion a mineralogical examination was made, and, as shown in

Miss Reynolds's report, the substance proved to be a rock glass. It is safe from our knowledge of the materials used in the manufacture of these eyes to interpret this as obsidian. The remains were therefore the fragments of an obsidian pupil which had been keyed into the backing where it fitted under the surround (Pl. CXX, Baqaria 33). This fact may be of interest to other excavators, as there seem to be no other reports of the appearance of devitrified obsidian. O.H.M.]

The Eyes

By H. E. Cox,

with

Notes

By A. Lucas.

White of an eye from Baqaria 25.

(Occurs in a number of other specimens and is referred to in text and plates as white glass. O.H.M.)

A small crescent-shaped piece, looking rather like rough white porcelain.

Composition :

Carbon dioxide	1·2 per cent	Iron oxide	2·0 per cent
Silica	47·2 „ „	Magnesium oxide	Trace
Calcium oxide	7·1 „ „	Sodium and potassium oxides	14·3 per cent
Aluminium oxide	26·6 „ „		

This composition is not that of a glass, but of a coarse pottery or porcelain. There is too much alumina for glass such as we now know.

Clay from the back of eye from Baqaria 25.

(Found also on a number of other specimens. O.H.M.).

Composition :

Carbon dioxide and combined water	24·8 per cent.	Iron oxide	Trace only
Silica	26·6 „ „	Calcium oxide	22·0 per cent
Aluminium oxide	27·6 „ „		

There is more lime in this material than one would expect in a clay, even of the Anorthite type, and I think it is a mixture of ordinary Kaolin with some chalk.

Adhesive from an eye from Baqaria 32.

Composition :

Resinous matter	35·0 per cent	Aluminium oxide	5·4 per cent
Silica	8·4 „ „	Calcium oxide	28·0 „ „
Iron oxide	1·0 „ „	Carbon dioxide	22·0 „ „

This corresponds to a mixture of 50 per cent carbonate of lime with some sand and 35 per cent of the resinous matter. The resinous constituent is partly soluble in alcohol and in petroleum. It has no acid value and only a very small saponification value (15). It gives no reaction for colophony or resins of that type and I could detect no sulphur. On heating

the resin there is a smell of cedar wood oil. I do not think this is an oleo-resin, as these usually have substantial acid values ; it is composed almost entirely of terpenes and suggests a dried-up cedar wood or similar essential oil.

H. E. C.

White of an eye. Baqaria 25.

This is certainly neither Egyptian faience, nor normal glass. Possibly it was intended to be glass, but quartz sand containing a considerable proportion of clay and only a small proportion of calcium carbonate may have been used instead of quartz sand containing only calcium carbonate.

Clay from the back of eye, Baqaria 25.

This appears to be a calcareous clay (i.e., marl), which is very common in Egypt. Kaolin does occur, but, so far as I know, only in one place, namely at Aswan, and this deposit does not appear to have been worked anciently.

Adhesive from eye of Baqaria 32.

Apparently a mixture of resin and whiting, a very common adhesive in ancient Egypt and one that was much used for fastening in place stone and glass inlay in Tut-ankh-Amen's jewellery and other objects. The absence of acidity I should explain by a reaction having occurred between the resin acids and the whiting, whereby neutral bodies would have been formed.

A. L.

The Linen from the Mummies in Bucheum O, Baqaria 1 and Baqaria 32.

By Thomas Midgley.

(*All the specimens are at the Chadwick Museum of Textiles, Bolton, and the left-hand numbers are their registration numbers in the Museum.*)

34.32.2. Pl. CVIIa. Figs. 1 and 2. Baqaria 1.

Plain weave, warp generally about double the diameter of the weft. Yarns loosely and irregularly spun. Made of vegetable fibre, not bast tissue. It is extremely brittle and weak. The fabric breaks into powder under the slightest pressure.

The microscopic structure of the fibre is similar to that used in some Badarian cloths. The very thin cell walls show close jointing. There is very little cellulose and the whole yarn breaks up into indeterminable fragmental material when placed in glycerine under a light cover glass. It is apparently some fibro-vascular tissue, not in any way related to flax.

The material available consists of very small bits and only in a few of these can the structure of the weave be determined.

20.32.9. Pl. CVII. Figs. 5 and 6. Baqaria 32a.

Fragments of fabric showing several layers, not all the same weave, closely adhering and impregnated with bitumen. About one-half the material is a plain weave, the weft being beaten

up so as to hide the warp threads. The other half is a canvas weave, both warp and weft being paired in each shed.

The yarn is spun from reed fibre. The diameter and twist is very regular in both types of weave.

20.32.10. Baqaria 32b and c.

Two brown-black fragments having the general character of the plain weave in 32a. A light brown fragment in a compact felted mass, composed of several layers of the plaited (?) fabric seen also in a sample from Baqaria 14. The interlacing of the warp and weft fibres is very irregular.

20.32.11. Pl. CVIIa. Figs. 3 and 4. Baqaria 32c.

Fragments of fabric similar in all respects to 32a.
(This was noticed by Fairman as being in strips 5cm. wide.)

34.32.3. Pl. CVII. Figs. 1 and 2. Bucheum O.

Fragments of compacted layers of woven fabric. All are made from yarns of grass or reed fibre, not much twisted, but spun with remarkable smoothness and regularity. Warp and weft are of similar diameter. The material is extremely brittle and the layers cannot be separated.

There are at least three types of weave; (*a*) Plain with the weft (?) close but not, apparently, beaten up; (*b*) weft (?) close, warps widely spaced; (*c*) a canvas weave, with parallel pairs of warp and weft. The yarn is similar throughout. Under microscopic examination the fibre breaks into minute fragments of vascular tissue with adhering parenchyma.

Exactly the same yarn was used in the earliest Badarian cloths from Mostagedda and adjacent sites, the same many-layered masses of fabric, of different weaves, being found in several interments. As in the present examples, there had been some substance used in the burial which permeated and stiffened the fabric.

The three samples are so fragmentary that it is not possible to define warp and weft. No selvedge was found on any of them.

Note.—The materials from which the fabrics have been prepared are of the same general character as those used at Badarian, predynastic and protodynastic settlements. May one presume that these somewhat nomadic tribes did not cultivate flax? It is evident that plants other than flax (Linum) were the source of fibre for yarns. The material used in any one fabric is always constant. I have never seen a mixture of fibres in the making of one yarn. It is probable that amongst such people wild plants which grew plentifully at certain sites and seasons, and which experience had proved suitable for spinning, were collected and the bast or other fibres extracted from the stems. To avoid the inconvenience of transporting unwieldy bundles of this loose fibre, spinning would follow the extraction as soon as possible and so the yarn would naturally contain only one type of fibre.

The fabrics from Mostagedda show quite conclusively that from Badarian until early Roman times vegetable fibres other than flax had been used in that area. Probably an examination

of material from other sites on the borders of the Nile Valley would show the same variety of yarn wherever settled cultivation of crops was not customary.

Photographic Notes

Pl. CVII, Fig. 1	Bucheum O		(C.M. 34/32/3)	This photograph shows the broken edge of one of the masses made up of compacted layers of fabric.
Do. 2				The surface of the same piece. Most of the field is plain weave. Towards the right a fragment of an adhering layer shows a canvas weave, two threads running in one shed.
Do. A 3	Baqaria	32c	(C.M. 20/32/11)	Shows two adhering layers of fabric of a similar plain weave.
4				Canvas weave from the same example.
CVII 3		14	(C.M. 20/32/7)	Shows the character of the reed fibre. (Compare with Fig. 4.)
Do. 5	Do.	32a	(C.M. 20/32/9)	Mass of closely adhering layers of fabric. The structure is obliterated by the resin which impregnates the whole tissue.
Do. 6				Surface view of the same piece. The centre shows a canvas weave, but the structure of this and the layers on either side, of plain weaving, is obliterated by the adhering resin and sand.
Do. 4	Do.	R.V.	(C.M. 34/32/1)	Shows the open character of the weave and the flax-like nature of the fibre.
CVII A 1 & 2	Do.	1	(C.M. 34/32/2)	

CHAPTER VII

STONE OBJECTS

In dealing with the inscriptions, Fairman has treated the stelæ reliefs so fully that there is no need to discuss that subject here. It is, however, worth mentioning that in common with certain other objects from this site the earliest are not the best, the highest peak of workmanship being reached in the reign of Ptolemy VI.

In the construction of these both the True digit and the Royal digit appear to have been used.

The small sandstone stela inscribed in demotic, illustrated in the plates dealing with that section, is of poor workmanship.

The inscribed blocks from the Bucheum are also treated by Fairman. The only two of any importance to the present study are the two lintels. The rough one on Pl. LIV, Fig. 5, is a reused block of Thothmes III, the Bucheum inscription being roughly painted in red on the reverse, and belonging, in all probability, to the Roman period. The finely carved limestone lintel was found on the floor of the entrance ramp, where it had been left by robbers too tired to remove it. If it belongs to the reign of Nekhthorheb or later, it probably came down from the overbuildings or may even have been at the entrance to the offering vault in front of the Nekhthorheb burial. If, as is well possible, it is earlier in date, then it is one of the many reused blocks and its provenance cannot be guessed at. The former seems to be the more likely theory.

The offering tables.—Twenty complete offering tables were found belonging to the Bucheum and the Baqaria, and fragments of eight or ten more, but there were probably many more than this number originally. It is not certain that every burial was supplied with them, for the officials were slipshod and erratic in furnishing the tombs, and there was, no doubt, much reuse of objects ; but, from the evidence of the offering tables bought in the village, a number must have been plundered for stone, both anciently and in modern times.

The tables were placed in the passage outside the tomb entrances, with their spouts pointing away from the burials, and photographs of some which were found *in situ* are on Pl. C, Fig. 3. Unfortunately, we cannot be certain that these tables were contemporary with the burials by which they were found ; they may have been reused, or replaced wrongly during one of the numerous periods of repair and rebuilding.

Fairman has been unable to date the tables by philological criteria, with the exception of inscription number 37, which can be placed between 90 and 80 B.C., and this one starting-point is insufficient to date the others on typological grounds.

Except for three fragments and one complete table in granite, and one in limestone, all the examples are sandstone. The craftsmanship of the carving is not impressive, with the exception of that on II a 1, but the series compares favourably, for the most part, with other examples of the Græco-Roman period.

Attempts to discover the measures used in cutting these have not produced very conclusive results, but the Royal digit and the True digit were probably used.

The tables are illustrated photographically on Pls. LVI to LXI. They are all at a scale of very roughly 1 : 4, though type I/II is a little large and II a 1 is a little small. The dimensions are given in the register below. We did not consider that drawings would give any additional information, and owing to the uncertain value of the provenance in the majority of cases, there seemed to be no call for a dual arrangement by provenance and type as has been done with a number of the other objects. The bases are either chamfered at the edge like I a 5, of which the under view is shown at the end of the series on Plate LXI, Fig. 4, or of the same dimensions and general shape as the top.

The designs fall into two main classes : I, in which the centre represents a sacred lake with steps leading down into it, and one or more channels, unconnected with the lake, leading off to the spout ; and II, in which the hollow is in the form of a cartouche, placed at right-angles to the spout, not always in the centre, and flanked by *kbḥw*-vases and loaves.

Type I has been subdivided according to the cutting of the channels. I a 1 has two separate channels, both well and deeply cut. From the outer channel two runaways lead down the spout. In I a 2 the inner channel has disappeared and the outer channel is not so deep. In I a 3 it is still shallower and the runaways are reduced to one. In I a 4 the maker has not troubled to carve out the channel but has outlined it deeply and rounded off the remaining portion, which he should have removed. The runaway has been cut out properly. I a 5 illustrates the logical result of this decadence, for the rounded centre has become a feature and the outlines are regarded as separate channels, both having runaways down the spout. I a 6 (on the next plate) is a poorly scratched version of this type, in which the well lacks any steps.

I b 1 seems to deserve separation from the above series, both on the grounds that it has one narrow, deep channel with a single runaway, and that it is inscribed on top. I b 2, the photograph of which arrived too late for publication, is similar, but uninscribed. I b 3 does not fit the sub-type well, but can scarcely be placed in the previous series, since it has only two stairs in the well.

As might be expected, a parallel decadence in the cutting of the well steps may be observed with the decay in the channel. The bevelling of the front of the table which occurs in I a 2, and also in II d 1, does not appear to have any typological significance and may be due to a flaw in the stone or to idleness on the part of a workman.

A parallel for type I exists in the British Museum, No. 554, labelled " Late Period," but this might conceivably have come from the same site. A specimen with two stairs, but not very like I b 2, is at University College. I believe that a number of tables, similar in design but with demotic inscriptions, exist in the Cairo Museum, but I have not been able to verify this.

It is tempting to think that the lake represented is the sacred lake of Armant, from which the bull would have been watered in life, but, taking into account the other known examples of this type of table, it seems safer to suppose that it was simply The Sacred Lake generically speaking. According to Plutarch, *De Iside, etc.*, V, Apis might not drink Nile water, but only that from the lake at Memphis, in the centre of which stood a Nilometer. Medieval travellers record the remains of a Nilometer in the sacred lake at Armant. According to classical authors Apis was drowned at the end of his life, and Mariette (*Le Sérapeum de Memphis*, p. 194) considers that he met the fate after twenty-eight years, with whom M. Chassinat agrees in his

article, "*La Mise à mort rituelle d'Apis*," *Rec. de Trav.*, Tome XXXVIII, pp 33. ff[1]. But, though the bull might be drowned in this lake, it seems dangerous to postulate any connection between the well on the offering tables and any of the rites specifically connected with bull worship.

Type I/II is a hybrid between the preceding type and type II and for this reason has not been given a separate type number. The well and channel are there and so are the *ḳbḥw* vases, the loaves and the lotuses. There are parallels for this in the *Cairo Catalogue*, *Tables d'offrandes*, by Ahmed Bey Kemal, Pl. XLV, 23.177 and 23.178, both Roman in date. It seems probable that our examples of this type and of type I are also Roman.

Type II is subdivided into : *a* those that have a row of water-lilies along the bottom, and *b* those that have not. Both examples of *a* are inclined to be better cut than those of *b*, and are therefore placed first typographically, though this may bear no relationship to the dating. There are also three degraded forms : *c*, *d* 1, and *d* 2. II a 1 has two loaves only, the *ḳbḥw*, the cartouche and the water-lilies. It is the only example in which the water pouring from the spouts of the vases is in low relief and pours away from the loaves on to the lilies, instead of on to the loaves. The knot of the cartouche is on the right, whereas in the other examples of this type it is on the left. The runaway has been cut to a proper depth to carry water from the centre of the table, though not from the cartouche : just as in type I the runaways do not connect with the well. The border is certainly decorative in this case and bears no relation to the channels for carrying off the water seen in type I. II a 2 has four loaves, represented by plain circles, and four rectangular groups of four bars each, the purpose of which is discussed below. The runaway in this and the subsequent examples is shallow and would leave much water in the centre by reason of the ridge left between the latter and the runaway. In II b 1 the four loaves are well shaped, though the actual cutting is poor the four groups of four bars again occur, though differently placed from those in the previous example, and the cartouche has degenerated into a simple rectangle, though its origin in a cartouche can be seen by the cut across the left-hand end. The *ḳbḥw* are more degraded than in II a 2. II b 2 has a degraded, though quite recognisable, cartouche, but in all other respects is decadent in comparison with II b 1 ; the groups of bars and loaves have completely lost their meaning and become parts of a pattern, and the *ḳbḥw* are but travesties of their true form. The introduction of fruit appears to be solely due to a desire to fill all the available space. It might seem advisable, from the evidence of the cartouche, to invert the order of the two examples of II b, but as the rest of the evidence is in the other direction, the present order seems better. II c has lost all but the border, the cartouche exists only as a rectangular depression, and the two groups of four bars are only used to fill space at each side of the depression. Even the runaway is only part of a decorative pattern. II d 1, equally or more debased, is in a different tradition ; the border is more in the style of a debased channel of type I, there is no depression, unless the lozenge-shaped object at the bottom be intended to represent this ; the three loaves and two *ḳbḥw* are quite recognisable. II d 2, which has no spout at all, is so worn that it is difficult to identify the design. It is apparent, however, that the *ḳbḥw* were present, and in the centre are two objects like bloated rats, which may possibly be trussed duck. The curved lines just visible in each top corner may be the stalks of lotus flowers like those on I/II. The fragments on this plate (LX) give the impression of belonging to shapes more akin to type II than I.

[1] This question is discussed in the Historical Summary, pp. 3–4.

We have not been able to trace exact parallels to type II. A cartouche is used for the depression in two offering tables in the British Museum :—B.M. 1541, from Meroë, in which the rest of the design is somewhat similar to I/II, and B.M. 1587, from Farās, but in both examples the axis of the cartouche carries down the spout instead of being at right-angles to it. II c, as has been stated, dates to 90–80 B.C., which seems to indicate that the whole series is Ptolemaic, but, against this, both II a 2 and II b 1 were found with a stela of Antoninus Pius—though this bears little weight. No close parallels to type II are illustrated in Ahmed Bey Kemal's catalogue of the offering tables in the Cairo Museum, nor, as has been stated, were we able to find any elsewhere, yet the main *motif*, water pouring from *ḳbḥw* on to loaves of bread, is very familiar, as are also the lotuses and the central depression for liquid. Prof. Margaret Murray pointed out that in both these types of table, late though they are in date, there are certain indications pointing to a connection with the pottery plates of offerings illustrated in Petrie's *Gizeh and Rifeh*. On Pl. XIV of that volume numbers 8, 9 and 12 are forms that may well be the prototype of these tables. There is the depression for liquid with a runaway down a spout and various offerings are grouped round it. Amongst the offerings may be seen the groups of bars, and in some cases the bars show alternate ends thickening. The same feature occurred on plates of a slightly different type from two Middle Kingdom tombs at Armant, 1213 and 1214 (*Cemeteries of Armant I*, unpublished), and here we gained a clue to their meaning. Some, in which the bars are of even thickness throughout their length, may well represent ribs of beef, as has been previously suggested, but those which are conical in shape undoubtedly represent the pottery cones, about 40cm. in length, which were found in the same tombs, and these in their turn (the prototypes of the stamped cones of the Eighteenth Dynasty) are probably imitation loaves of bread. The cartouche shape for the depression is probably a late alteration, as such a shape for any sort of container is well known at this date ; there is a paint palette at University College in this shape, and even baths have been found cut as cartouches. If there were a corpus of offering tables, it would probably be possible to trace the development of this type from the Middle Kingdom pottery plates.

Type III, being reasonably well cut in hard granite, would hardly seem to be a debased form, though the blank centre gives that impression. A very coarse offering table in limestone, with only a channel and one runaway, is dated to the Græco-Roman period by Ahmed Bey Kemal (*op. cit.*, Pl. XXXIV, 23, 139).

Type IV is derived from four loaves and two *ḳbḥw*, as can be seen from Pls. XXXVII–XXXVIII in Ahmed Bey Kemal's book quoted above. All the series given there are Ptolemaic, including 23.151, which, like this, shows only the loaves.

Type V is too decadent for it to be possible to decide on its prototype, though type I seems possible. The four fragments illustrated in the inscription series, No. 29–32 inclusive, included too little of the top to be typable.

Uninscribed Stelæ.—The cow stela from Baqaria 29 is of sandstone, 48·2cm. high, of reasonably good workmanship, and was originally coloured. It is surprising to find an official stela with a carefully cut relief uninscribed, because the bull stela of Diocletian, of the same or later date, was inscribed in hieroglyphs. There are two possible alternative explanations of this stela ; either it was made especially for the cow burial and was not deemed of sufficient importance to carry an inscription, or a relief performing some function in the lives of the animals was adapted to a funerary purpose. Though the former seems to be the more likely explanation,

the latter must be considered on account of the two parallel stelæ shown on Pl. CVIII. Fig. 1 was bought by Prof. Petrie in Armant, and Fig. 2 is in the Cairo Museum, $\frac{12|3}{25|8}$ (ht. 62cm.)[1]. Both these stelæ are inferior in execution and design to the example from Baqaria 29, and, if they are to be regarded as funerary cow stelæ of a period close to the time of Diocletian, it seems probable that they belong to other separate cow burials subsequent to that date. Such may exist under the near-by village. There is no great difficulty in accepting this explanation from the historical point of view, for the great temple of Serapis at Alexandria was certainly not destroyed until A.D. 385, nearly a hundred years later, and Dr. J. G. Milne is of the opinion (*A History of Egypt under Roman Rule*, p. 95) that even then pagan worship was not suppressed in Upper Egypt. There is an archæological difficulty, however, for though the whole temenos area of the Bucheum was trenched and much likely ground nearby tested, no trace of solitary bull burials was found (see the aerial photo on Pl. X, Fig. 1). This difficulty can, however, be met if the Petrie stela, which is less degraded than the Cairo example, be regarded as prior to Baqaria 29. In that case it would only be necessary to account for one cow without a bull. This would be quite a possible occurrence, for if the last bull, as he might be expected to do, outlived his mother, the mother might be buried with full rites, while the religion was still functioning, and later the bull himself be slaughtered in the destruction of the pagan religion. The supposition that these stelæ are not funerary cow stelæ at all, must not, however, be disregarded, for if true there would be no need to postulate further burials after the time of Diocletian.

Votive Stelæ.—In addition to the one hieroglyphic and one demotic votive stela, described in their respective sections, the only votive inscriptions found were those on pebbles. There were found also, however, a number of objects which may have served this purpose. Pl. LXI, Figs. 6 and 7, each represent a man walking, holding a staff in his left hand. In Fig. 6 he is preceded by a bull and his tail shows that he is a god or a king. On the analogy of the demotic stela he may be Mentu. These are probably votive stelæ, and the trapezoidal sandstone objects in Figs. 1–13 on Pl. LXII probably served the same purpose. Nos. 1–7 of the latter objects may represent Buchis mummies seen in full face. A comparison with the uninscribed cow stela from Baqaria 29 will show the resemblance. The analogy, such as it is, does not apply to numbers 8–13 and 16. Nos. 11–13 resemble parts of Coptic tombstones, but the others undoubtedly belong to the series and yet the three or more plumes can hardly represent the crown of Buchis. Either these are late examples, in which the meaning of the design had been forgotten, or else the whole series has some meaning other than that suggested above.

The *Sandstone Altar*, Plate LXII, Fig. 14, was found in the superstructures and in the hollow at the top of it was some resin. We have been unable to trace any parallels to it, and can, therefore, make no suggestion as to its date.

Stone Vases.—The stone vase on Pl. LXII, Fig. 15, was found near to the faience *nms.t* jar inscribed for Nekhthorheb, in the dump-heaps belonging to the period of rebuilding in the Bucheum. It may also have belonged to the same burial, but, even if so, it is probably an archaic vessel reused.

There are many lacunæ in the document *The Apis Papyrus* on Pl. XV, Col. B, where it deals with the stone dishes—but the following requisites are clear. " Two ointment dishes of crystal to hold 10 *hin* of oil each." . . . " Five alabaster containers . . . one large." . . . " Nine *mhi* stones,

[1] We are indebted to Sir Flinders Petrie and the authorities of the Cairo Museum, respectively, for kind permission to publish these objects.

nine *whi* stones." . . . " Ten (?) ointment pots of crystal (*thn*) with water." . . . " A crystal *wḏ.t*, an *wḏ.t* of *nm* wood. These must be on a mat covered with cloth. They are one and two-thirds Divine cubits long, 1 palm deep, 8 palms broad. Their overpart is of papyrus, while it [*sic*] has a *knt* which is 1 palm separately. Another offering ship, containing two alabaster containers, each of 2 *hin*, one with pleasant fat, the other with *gw-m*3 ointment."

The jar illustrated holds about 2·2 *hin*, a result close enough to allow us to identify it with the 2-*hin* containers of *The Apis Papyrus* if we could be quite certain that it was not intrusive. Fragments of another alabaster jar were found by Dr. Frankfort " in the filling to the north of the stone sarcophagus chamber " (Bucheum 10). He gives a rough estimate of the height of the restored pot as 18cm. and the width of the largest fragment as 14·5cm. Unfortunately, from the rough sketch given and these dimensions, it is not possible to estimate its cubic contents and we have not been able to trace the pot. The evidence of its finding supports the supposition that the example here illustrated belonged to Bucheum 10, the Nekhthorheb burial.

No canopic jars of Buchis were found, nor did any of the pots exhibit signs of having contained entrails. It is shown in the chapter on the mummies that the bulls and cows were not eviscerated at mummification. On Pl. CX, Fig. 2, are shown four of the canopic jars from the Mnevis burials. The left-hand two belong to one set and the right-hand to another. The tallest jar is 76cm. high and the shortest 60cm. These objects are published by kind permission of the curator of the Cairo Museum. The objects are numbered $\frac{14|7}{18|1\text{-}11}$.

Human Statuary.—Pl. LXIII shows all the fragments of human statuary found. The basalt fragment comes from the well in the Baqaria Roman Village and by the fine modelling of the neck appears to be Saitic in date. The little seated steatite figure of Osiris was found with two bronzes in the superstructures of the Bucheum. It is probably Thirtieth Dynasty or Early Ptolemaic. The sandstone fragment of a head is so battered that it cannot well be dated, but the mouth does not seem to be Ptolemaic and is not unlike that on known representations of Nekhthorheb. Of the three limestone heads, the trial piece of a Ptolemaic Queen shows good craftsmanship of its period. It was found in the floor of the superstructures. Of the other two, both found in the entrance passage, the upper and more complete is unquestionably the least bad. It appears to be Ptolemaic. The lower one, broken in two pieces, may be Roman. The remaining two limestone fragments come from the Baqaria Roman Village and are Roman.

On Pl. CX, Fig. 2, is shown, also by kind permission of the curator of the Cairo Museum, statue number 37075, in black granite, which comes from the Karnak cache. It represents a certain priest, Ahmes, son of Smendes, whose titles contain the phrase *Ḥnk-Nwn*, Priest of Hermonthis, Priest of Nekhthorheb, Embalmer and person who enters into the burial place (*Ỉmntt*) of the bull, who is in Madamud. By which it seems very possible that this was the first priest of the Bucheum. The section of the inscription containing the titles is not shown in the photograph, as Fairman has published the statue in full in the *J.E.A.*, XIX, parts iii and iv. The statue is 90cm. high.

Sphinxes and Animals.—At the top of Pl. LXIV are shown two views of a female sphinx; Fig. 3 is a male sphinx and Fig. 6 a hawk, all in limestone. The sphinxes were found in parts scattered about the entrance passage, together with the remains of another female sphinx. It is difficult to imagine why robbers should drag these heavy lumps of stone down into the Bucheum, but at the same time it seems unlikely that they were originally underground, where there is no space for them. As has been shown in the chapter on the Architecture (p. 36) there is a

possibility that they may originally have rested upon the brick mastabas O K, O H and O E, in the same way that the hawk probably stood upon the column O A, perhaps with a companion upon O B. The hawk is shown as found on Pl. C, Fig. 2. It can be seen that at one period it was repaired with crude white plaster.

None of these objects is of notable craftsmanship, but the hawk was probably originally a better object than any of the sphinxes.

The limestone bull's head was originally painted red, and comes from a human tomb, No. 203, much robbed, which was found about 190 metres S.W. by S. of the Bucheum. The tomb was published in *J.E.A.*, XVII, pp. 224 and 230. The head bears a close resemblance to that on the Isis-Apis statue in the Vatican (J. G. Milne, *History of Egypt under Roman Rule*, Fig. 104).

The small limestone fragment appears to represent the face of a harnessed horse, to which the ineptness of the artist has given an expression of deeply pained surprise. It was found unassociated in the Baqaria Roman Village.

The first figure on Pl. CIX represents a bull in a boat, probably Apis in a sacred bark. It is carved on a piece of limestone 20cm. high and is published by permission of the Director of the Leipzig Museum, who very kindly sent us this interesting photograph. It is known from the stelæ that Buchis did much travelling in a sacred bark, and no doubt this carving is a fairly accurate representation of the vessel employed. The relief is also interesting as a clear example of the technique of showing two faces of one object without the use of perspective.

Stone amulets and beads are dealt with in the Amulet and Bead chapters. The sarcophagi are also treated separately.

O. H. M.

STONE OBJECTS

OFFERING TABLES

Pl. & Fig.	Type	Inscription No.	Provenance	Material	Size centimetres	State	Notes	Distribution
LVI 1	I a1	35	Bucheum 19	Sandstone	29 × 26½	Whole		B.M. 1778
2	I a2	—	,, 9	,,	37 × 27	,,	Found 1928/29	B.M. 1704
3	I a3	43	Baqaria N. Passage	,,	29 × 22½	,,	Found 1927/28	B.M. 1705
4	I a4	41	,, ,,	,,	28½ × 25½	,,	Found 1927/28	B.M. 1706
5	I a5	—	Bucheum 19	,,	44 × 35	,,	Found 1928/29	Brooklyn
6	I b1	42	Baqaria N. Passage	,,	38 × 28½	,,	Found 1927/28	Cairo 53259
LVII 1	I b3	—	,, P.27	,,	40 × 37	Broken		Buried
2	I a6	—	,, P.21	Bk. ,,	50? × 50	Chipped		,,
— —	I b2	—	Bucheum 9	Sandstone	31? × 30½	Whole	Found 1928/29 (Not shown in plate)	Toronto
LVII 3	I/II	38	Baqaria P.26	,,	68 × 50	,,	(Cast at W.H.M.M.)	Cairo 55627
LVIII 1	II a1	33	Bucheum 11	,,	54 × 53	,,		Cairo 53148
2	II a2	36	,, 7a	,,	53 × 53	,,		B.M. 1703
LIX 1	II b1	34	,, 7a	,,	53 × 53	,,		B.M. 1702
2	II b2	39	Baqaria P.20	,,	46 × 42	,,		Toronto
LX 1	II c	37	,, P.25	,,	32 × 33	,,		Copenhagen
2	II d1	28	Bought in 'Ezba	Rd. ,,	38 × 35	Worn	Buchis	W.H.M.M.
3	II d2	40	,, ,,	Sandstone	39½ × 39½	,,	Cow	Manchester 9108
4	?	—	Baqaria X	,,	— —	2 Frags.		Buried
5	?	—	Bucheum X	Granite	40 × 37	Small Frag.	Might belong Inscr. 27	,,
6	?	—	Baqaria X	Sandstone	— —	,, ,,		,,
LXI 1	III	—	Bucheum 20	Granite	30½ × 28	Whole	Found 1928/29	B.M. 1707
2	IV	—	Bucheum	Limestone	15 × 16½	Chipped	,, ,,	Toronto
3	V	—	Under floor of superstructures	Sandstone	13½ × 11½	Whole	,, ,,	B.M. 59451
?		29	Bucheum X	,,	47? × ?	Frag.	Priest of Buchis	Held at Ar.
?		30	R.V.200	Rd.Sandstone	— —	,,	,, ,, ,,	Toronto
?		31	,,	,, ,,	— —	,,	,, ,, ,,	Buried
?		32	,,	,, ,,	— —	?	,, ,, ,,	,,
N.R.A.		27	Superstructures	Granite	— —	,,	Found 1928/29	?
N.R.A.		—	,,	,,	— —	,,	Do. Might belong Inscr. 27	?
N.R.A.		—	,,	Sandstone	— —	,,	Found 1928/29	?

N.R.A.—No reproduction available.

Pl. & Fig.	Provenance	Object	Material	Size[1] centimetres	State	Notes	Distribution
LXI 5	Baqaria 29	Cow Stela	Sandstone	48·2 × 23·5	Broken	Painted	Cairo
6	Superstructures	Votive ,,	,,	24 × 18·5			B.M. 59434
7	,,	,, ,,	,,	19 × 15·3	Broken	Reverse as Fig. 11	B.M. 59435
LXII 1	,,	,, ,,	,,	11 × 9	Chipped		B.M. 59440
2	Bucheum X	,, ,,	,,	10·5 × 8·5	,,		Buried
3	,, ,,	,, ,,	,,	11 × 9	,,		Divided W.H.M.M., Toronto, and Manchester
4	Baqaria R ,,	,, ,,	,,	13·5 × 8	Cracked		
5	,, ,,	,, ,,	,,	14 × 11	Whole		
6	Superstructures	,, ,,	,,	14·5 × 11·5	Chipped		B.M. 59437
6	,,	,, ,,	,,	13 × 8·5	,,		B.M. 59439
7	Baqaria R.	,, ,,	,,	9 × 15	Fragments	Reverse as below	Buried
7	,, ,,	,, ,,	,,	10 × 15	,,	Obverse as above	,,
8	Superstructures	,, ,,	,,	c 12 × c 7	,,		B.M. 59438
9	,,	,, ,, ?	,,	7 × c 5	,,	Coptic ?	B.M. 59443
9	,,	,, ,, ?	,,	9·5 × 5·0	,,	,, ?	B.M. 59444
10	,,	,, ,, ?	,,	6 × c 4	,,	,, ?	B.M. 59445
11	,,	,, ,,	,,	c 4·5 × 5	,,		B.M. 59446
12	,,	,, ,,	,,	c 7 × 5	,,		B.M. 59447
13	,,	,, ,,	,,	c 6 × 5	,,		B.M. 59442
14	,,	Altar	,,	11 × c 4	Broken	Filled with resin	B.M. 59455
15	Bucheum dump	Jar	Limestone	20·1 × 22	Whole	From Buch. 10 ?	
—	Nr. Bucheum 10	,,	Calcite	c 18 × c 16	Fragments	Found 1928/29	Buried

HUMAN STATUARY

LXIII 1	Baqaria R. Well	Head	Basalt	c 8 × 6½	Fragments	Saitic ?	Central School of Arts and Crafts, Southampton Row, London
2	Superstructures	Seated figure	Steatite	14 × 3	Whole	Osiris	Toronto
3	Bucheum X.	Head	Sandstone	c 9 × 7½	Battered	Nekhthorheb ?	C.S.of A.C.
4	,, ,,	,,	Limestone	c 15 × 15	Whole	Ptolemaic	Manchester 9109
5	Superstructures	Bust in relief	,,	19.5 × 14	,,	Trial piece, Ptol. Queen	Ashmolean
6	Bucheum X.	Head	,,	c 15 × 15	Broken	Roman ?	C.S. of A.C.
7	Baqaria R. Well	Bust	,,	c 22 × 19	Fragments	Roman	Toronto
8	Baqaria R.	Standing figure	,,	c 20 × 5	,,	Roman	C.S. of A.C.

ANIMAL STATUARY

LXIV 1 & 2	Bucheum X	Sphinx	Limestone	c 40 × 20	Broken	Female	B.M.
3	,, ,,	,,	,,	c 40 × 15	Fragments	Male	B.M. 1700
4	Baqaria R.	Head of horse ?	,,	c 3 × 1·5	,,		C.S. of A.C.
5	Ar. 203	Head of bull	,,	c 24 × 13	Chipped	Painted	Toronto
6	Bucheum OA	Hawk	,,	55 × 45	Broken	Repaired anciently	Buried

RE-USED BLOCKS FROM BUCHEUM

Pl. & Fig.	Provenance	Object	Material	Inscr. No.	Description.	Distribution
LIV. 1	Opp. Buch. 11	3 blocks	Limestone	46	Aahmes I, see Vol. II, p. 48	B.M. 1708
2	Buch. 18	Part of blocking	Sandstone	47	Nekhthorheb offering to an Ibis	B.M. 1710
3	Buch. W. pass.	Fragment	,,	48	Mentu seated before throne with offering	Buried
4	Bought in 'Ezba	Block	,,	49	See Vol. II, pp. 50–51, 22 x 33cm.	Vienna
5	Buch. entrance	Back of lintel	,,	50	Block of Thothmes re-used and painted	*In situ*
6	Armant	Fragment	,,	51	Block from Roman temple	Buried
LV 1	Buch. W. pass.	Block	,,	52	Head and cartouche of Rameses VI	B.M. 1711
2	,, ,, ,,	,,	,,	53	King offering to Mentu	*In situ*
3	,, ,, ,,	,,	Limestone	54	Scene of offering	*In situ*
4	,, ,, ,,	Lintel	,,	55	See Vol. II, p. 51	Copenhagen, N.G.
5	Wall front E&F	Block	Sandstone	56	Block of Horemheb	Buried in Bucheum
	,, ,, ,,	,,	,,	56	See Vol. II, p. 51	,, ,, ,,
	,, ,, ,,	,,	,,	56	,, ,, ,,	,, ,, ,,
	,, ,, ,,	,,	,,	56	,, ,, ,,	,, ,, ,,
	,, ,, ,,	,,	,,	56	,, ,, ,,	,, ,, ,,
	,, ,, ,,	,,	,,	56	,, ,, ,,	,, ,, ,,
6	Bought in 'Ezba	Stela	,,	57	Uninscribed, shows Ptol. king offering to Mentu & Khnum	Held
—	Buch. 18	Block	,,	—	Cartouche of Rameses II 27½ x 18	Buried
—	Buch. X	5 frags. cornice	,,	—	Uraei crowned with sun disks	B.M. 59456
—	Buch. X	Broken fragment	,,	—	Early Aten cartouche of Akhenaten	B.M. 1720

[1] c=*circa*.

CHAPTER VIII

POTTERY

THE pottery of the Græco-Roman period should be the most closely dated of all wares found in Egypt, for not only were many of the same forms in use all over the civilised world at that date, but there was much datable material, such as papyri, coins and ostraka, not in evidence at other periods. Unfortunately a variety of causes has prevented the accumulation of information that might reasonably be expected. The excavations at the Serapeum, which should have provided invaluable criteria, were undertaken before pottery was regarded as anything more than waste material. The early papyri hunters took little or no notice of pottery and the only body to do a scientific excavation of a well-preserved Roman town in Egypt, the University of Michigan, do not propose to publish their pottery for some time to come. In addition to this, Græco-Roman pottery is not beautiful, nor is it of great interest in itself, and has therefore been cavalierly treated when found. Moreover, complete pots are seldom discovered, for Roman cemeteries yield so little to the excavator that they are rarely dug.

One of the chief reasons for the importance of the study of pottery is because it can be used to date other objects. Those who have found Roman pottery closely dated have argued that there was no need to trouble with it, forgetting that much material of this date is found without any obviously dated objects.

We have endeavoured to make a beginning with the study of this important but neglected subject. Like all beginners, we have made a number of mistakes and the earlier records in particular are incomplete. As we progressed, our methods of recording developed and, during the latter half of the work, the details given corresponded fairly closely with those required by the *International Corpus of Egyptian Pottery*. There was not, at the time when this work was done, anyone in camp with a technical knowledge of pottery, and of the many people who drew the pots published here, not one had drawn a pot before he came to Armant, where there was little time for experiment and practice. For these reasons a certain unevenness of line has been inevitable. In a number of drawings details of ware and colour are missing and a few specimens are published without section lines.

The Plates.

Most of the pots found were broken and it was obviously quite impossible to make a complete photographic record that would be of the slightest value, and the photographs on Pls. LXXIX to LXXX are of the specimens found complete and illustrate only the types which accident provided for. Of the drawings, Pls. CXXVII to CXXXIII show groups of pots found in individual burials in the Bucheum and the Baqaria and are given in addition to the corpus for convenience of reference, all the examples being repeated in their proper places in the type series.

The Corpus.

Scope.—The corpus comprises Pls. CXXXIV to CLIV and illustrates all the Græco-Roman pottery found on the site, including that from cemeteries 700 to 900, which was published in group form in *J.E.A.*, Vol. XVII, 1932, Pls. XLV to LIV. In addition there are a few specimens of Dynastic and Coptic ware, labelled as such and having no type numbers. For convenience of reference the Dynastic ware is placed immediately prior to class 81, as it served the same purpose as the pots in that class. The Coptic follows the miscellaneous untyped specimens at the end.

Classification.—The classification of pottery presents one of the major problems with which archæologists have to contend, and no method has proved, or is likely to prove, completely satisfactory. The natural classification of pottery is obviously that of the makers—by use. The *Ballas* and the *Qulleh* are *named* after the places of manufacture, but each is made for a specific purpose and traded for such purpose only. Unfortunately the uses of the vast majority of ancient pots are uncertain, and even were they known, a corpus so classified would present immense difficulties in reference. The only two reasonable criteria left to us are shape and ware. The latter was considered, but was found to be useless for the material published here. In class 48, for example, the majority of the pots were made of a hard green or yellow-grey body. A number, however, were made of red paste and given a yellow slip. The origin of this custom is apparent. This particular pot was invented at some spot where the grey clay was used. Imitators coloured their pots the better to reproduce the original ware, just in the same way that the flint-workers at Brandon, who are now obliged to use Norfolk grey flint (as the Brandon mines are no longer worked), colour their finished products with black boot polish, lest the simple aborigine, who knows the high quality of black Brandon flint, will not buy them. We were left with no alternative but classification by form alone. Usually this has been found the most satisfactory criterion and has always been used for secondary classification when the main divisions have been by ware or date. It is never possible to be absolutely consistent in a classification without causing confusion, because, as explained above, the potter did not make his pots to fit certain criteria of form, but of use. It is usually necessary to make one or two exceptions where common sense demands it. The incense burners in class 63 are of a variety of shapes and normally most of them would have been included in the miscellaneous class at the end, but it was obviously more convenient to let them follow the other incense burners. Class 58, lamp-stands, cannot be better placed than following lamps with stand, 57, which, in their turn, follow the lamps without, 56. In the same way single-handled jugs have been kept together, 92–99, and amphoræ 85–90. In the latter case little variation from the normal order was necessary. With these exceptions the classes run consistently from the most open to the most closed, taking always the first, or type specimen of each class as guide.

Subdivisions.—Within each class the variations have usually been typed also from the most open to the most closed, but, in some cases, where the results of this procedure would have been ludicrous, other criteria have been applied. For example : in Classes 7 and 16 the specimens divide naturally from the shallowest to the deepest, that is, showing an increasing discrepancy between the height and the width at the mouth. Class 94 shows the degradation of the form in the decay of the shape of the handle, and the amphoræ in 88 have been divided by the same criterion—in this class a greater number of specimens might have provided a better standard of comparison. Certain classes, for example 77 and 96–99, show such an obvious general

decay of the pristine form, which cannot be fastened on to any one feature, that their arrangement calls for no comment. Classes 81 and 82 may show more obvious variations with the accumulation of more examples ; 81 is typed from the best-formed neck and mouth to the worst, and 82 from egg-shaped vessels to almost diamond-shaped.

In the arrangement of this corpus we are indebted for much valuable assistance to Mr. G. Lankester Harding, editor of the *International Corpus of Egyptian Pottery*, and, although that body is in no way responsible for the corpus published here, we have, as far as possible, ensured that when the drawings are incorporated in the Græco-Roman section of that work, the minimum amount of alteration will be necessary—compatible with amalgamation with a large number of different types.

Arrangement on plates.—The drawings have been arranged so as to give the maximum possible ease in handling. Each type starts on a new line and all are arranged strictly in rows with the tops level. This order has been sustained throughout, even where individual variations in size have meant the loss of considerable space. All the figures and letters on the plates have been inserted in print.

Where pots, though Dynastic in date, appear to be the prototypes of Græco-Roman types appearing in the corpus, they have been included in the type series. Similarly, pots which belong to the Coptic period, but are derived from Roman types, have been added in their proper places. In any system of corpora it will always be inevitable that some pots are included in volumes of two separate periods, for, if they were not, it would be necessary to use two different volumes when typing any one group which proved to be on the borderline between two periods.

Dating.—For dating purposes the results from the burials have been extremely unsatisfactory. Quite apart from the difficulties of dating the tombs themselves with any accuracy, the Bucheum and Baqaria were both so badly robbed and so much altered in ancient times that the attribution of most pots to the date of the burial with which they were found associated is uncertain. In cases where both date of the tomb and the connection of the pot with it are reasonably certain the date has been inserted by the pot. In cases where the pot may safely be attributed to the burial, but the date of the latter is uncertain, or where the date of the burial is certain but the pot is doubtfully connected, the date has been inserted by the tomb number with a query.

The dating of the village material is more certain. The evidence of the coins, as shown on p. 115, limits the period of the village's existence to between A.D. 275 and 395, but the probable period of occupation is from 285 to 395. The village pottery can therefore be safely attributed to some date within 110 years, though it is obvious that not only many of the types, but many of the individual shapes may have had a very much longer range of time. For example, there are a number of shapes which occur both in the village and in the Bucheum or Baqaria. In class 7, b and c are from the village, whereas c1, c2, and c3 are from the Bucheum and the Baqaria, and d occurs both in the village and the Bucheum. It is unlikely that the robbers would carry much pottery into the scene of their labours, with the exception of water jars and lamps. On the other hand, an odd specimen of Bucheum pottery in the village may only be part of some robber's haul, used, perhaps, for the safe transport of gold leaf or of beads. Allowance must also be made for the use of the pits made by the robbers as a dump for broken crockery, and this may be the explanation of the number of amphoræ found in Baqaria 4. The inhabitants of the village appear to have buried their dead in cemeteries 700 and 900, possibly also 500, but so few

graves were dug in the latter place that it is unsafe to draw conclusions. No very close dating can be expected from a body of pottery confined to so small an area and so short a period in time, but such material when published may well be dated by future finds when these are collated and collected together in the *International Corpus*.

The bulk of the pottery illustrated was found in the seasons 1929–30 and 1930–31, but there are included among them forty pots found by Dr. Frankfort. These were originally drawn by Mr. Alan Shorter at full scale and with a solid section, and were later redrawn by us in order to fit them into the scheme. With the exception of the groups Bucheum 7–8 and 19–20, the bulk of these had no provenance and have been inserted as Bucheum X. In addition to these there were records of forty other pots found during that season (1928–29), including, curiously enough, a large group of Roman pots from Bucheum 14. Unfortunately there are no drawings of these and so it has not been possible to include them.

Use.—The following list of pots has been extracted from *The Apis Papyrus*, Pls. XIV to XV. The alphabetical enumeration has been inserted for ease of reference.

APIS POTTERY

		Height.	Depth.	Breadth.
A	15 Dishes. These are laid under the *trf* of the god that nothing may fall therefrom. See their shape [space]	6 p.[1]	7 p.	7 p.
B	4 Great Water vessels, in them must be enclosed what is in the entrails (?) so that (or while ?) a *rhyny.t* is in them. Their form [space]	1 D.c.	6 d.	
C	4 *Mšy-dishes*. In them is taken the Horus-copper when it comes out of the box with the things which are in it, in four other *mšy*-plates. Their form [space] ...	1 D.c.		2 p.
D	10 *Ḥn*-pots. These are they in which the things and cloth lie which lay in the box. Form [space]	1 D.c.	1 p.	1 p.
E	4 Small water vessels. In them is poured what was in the entrails. Form [space]	5 p.	4 p.	3 p.
F	4 Great pots. Into them is poured what was in the entrails, water and oil, each having a part of the purification in it. Form [space]	1 D.c.	5 p.	5 p.
G	4 *ỉ'myt*-pots.			
H	[4 *'ny.t*] They have then four *'ny.t*. They press the water with which the entrails are purified in them. Form [space]		1⅛ D.c.	5 p.
I	2 Small *ỉ'm.t*-pots. They have their ... to press the water of the *krs* into them Form [space]		1 D.c.	5 p.
J	20 Ointment pots, in which to lay the *nms* cloth of the Anus. Form [space] ...		4 p.	2 d.
K	10 (?) ... to do with the *nms* stuff of the ... which is led to the level of the first day. Form [space]	1 D.c.	1 p.	1 p.
L	20 *ḏny.t*. These are what are laid under the *trf* of the god. Form [space] ...	1 D.c.	3 p.	3 p.
M	16 *rks*-pots. In them is laid the Horus copper when it is cleaned each time ... the purification when it is covered with cloth. Form [space]		8 p.	3 p.
N	16 *ḏlḥ*-pots. The Horus copper is purified in them at each time of ... the purification. 4 each (?) for one god			
O	[4 *mšy*-dishes.] Further 4 *mšy*-dishes in which the Horus-copper is purified after the purification of the " Leader " (*wr-ỉ'rỉ'*). Form [space]	1 D.c.	1 p.	5 p.
P	(x) *pst'ỉ'*-pots. In them is laid the Horus-copper, when they are finished with it, to purify it by the *wr-ỉ'rỉ'* while four *mšty-t* are therein. Form [space] ...	1 D.c.	8 p.	8?p
Q	2 *t'y*-pots wherein to lay the Horus-copper when it comes to enter	1 D.c.	8 p.	8 p.
R	4 Wash pots in the form of a pond that the *wr-ỉ'rỉ'* may purify with. Form [space]	1 D.c.	4 p.	4 p.
S	4 Great jugs to lay the Horus copper in when one goes out of the ... Form [space]	1 D.c.	5 p.	4 p.
T	4 Little jugs wherein to purify the *krs*. Form [space]	1 D.c.	4 p.	3 p.
U	4 Great *ỉ'myt*-pots, wherein to do the Horus copper while they are filled with pitch		1 D.c.	1 D.c.

1. D c. = Divine cubit. p. = palm. d. = digit.

In attempting to identify any of these pots with those which we have discovered to have been used with Buchis a number of difficulties occur. The first of these concerns the length of the Divine cubit which is referred to throughout. A number of cubits used in Ancient Egypt are known, of which the Royal cubit is the commonest, but there is no evidence as to

which of these is the Divine cubit. Prof. Griffith (*Cat. Dem. Pap. Ryl.* III/81, n.g.) says: " The cubit employed in the Ptolemaic temple of Denderah is the ordinary Egyptian 7-palm cubit of 28 digits, 20·6in. or ·522cm. Presumably this is the ' Divine cubit ' of the demotic documents, though on cubit rods it is marked in hieroglyphs as the Royal cubit." Prof. Spiegelberg (*Rec. de Trav.*, XXVIII/189) said: " The Divine cubit, which occasionally occurs in demotic documents . . . may or may not be the Royal cubit, or may possibly be a third kind of cubit in addition to the Royal or Little." The divinity of the king is slight evidence in favour of the Royal cubit being the same as the Divine.

In equating the Bucheum pottery with the list from *The Apis Papyrus* it is necessary to discover first what dimensions are intended in the papyrus. Three are given—height, depth and breadth. It would be difficult enough to understand to what these referred in any series of objects; but this difficulty is greatly increased when dealing with pottery. However, applying what is known of Egyptian pottery, a reasonable deduction of what was intended can be made.

Let h = Height, d = Depth, and b = Breadth, then:

d cannot be the height of the pot less the neck and the foot, because in two cases d is greater than h.

Neither can h be intended for this measurement, because in most cases h is greater than d.

If h be the width of the mouth, all the pots, including jugs, would be flared. If h be the width of the base then in every case the base is wider than the mouth, a phenomenon which does not occur in Egyptian pottery except in a very few small jugs, all much below the lowest dimensions given here. If h be the width of the widest part of the pot, then every pot would be greater in width than height, a hypothesis impossible at the date when the MS. may be presumed to have been written and almost impossible at the date at which it was compiled.

By corollary it is impossible for d or b to refer to the height,

h must therefore refer to the height.

The only essential measurements left to equate with d and b are the breadth at the widest point, the width of the neck and the width of the base.

Now, in five cases d exceeds b and in three cases b is greater than d.

If d be the width of the base, in five cases the base will be the widest part of the pot which is ruled out by arguments adduced above.

For similar reasons b cannot be the width of the base,

Then, of d and b, one must be the breadth at the widest part and one the width of the mouth or neck.

If d be the width of the mouth and b the breadth at the widest part, then in F and G, both storage jars, the result will be a flared pot like an upturned bell which of all possible shapes is the least suited for storage.

Therefore d is most probably the breadth at the widest part and b the width of the mouth.

There is considerable internal evidence to support this view:

In A the sides will be vertical, a suitable shape for the purpose.

In F and G the required shape is found.

In H the wide mouth is convenient for the purpose required.

In I the reverse is the case but the discrepancy between the two measurements is not so great as in H, and combining the evidence of I and J, the above interpretation of the meaning of b and d is still the more likely.

In J the proportion of the dimensions is exactly what it should be for a cosmetic pot.

The rest of the examples do not affect the argument.

Assuming, therefore, that h is the height, b is the width of the neck and d the width of the pot at its widest part (or in the case of pots with vertical or flared sides, the base), it is possible to discuss the individual measurements given.

The first difficulty is with the sizes of the pots mentioned in *The Apis Papyrus*, which are all rather large. It will be noticed that eleven examples have a height of one cubit. There is not a very large number of pots from the Bucheum of sufficient size to be equated with the Apis series. If specimens of Apis pottery were available, the task would, naturally, be much simpler. A tomb of Mnevis was excavated as recently as 1919, which might have yielded valuable results; unfortunately M. Daressy in *Annales du Service*, Tome XVIII, p. 210, finishes his account of the objects found with the remark: " Les fragments de jarres et vases, en poterie ordinaire, de formes diverses, n'offrent rien de particulier "; beyond this he gives no record.

There is thus no material other than the scanty supply of large pots from the Bucheum.

A good starting-point is some fragments of a large jar found by Emery which carried the following inscription : " (1) The purifications of the bones of the mother of Buchis. (2) Year two, second month of inundation. (3) Year nine, second month of inundation. (3a) Year . . . ." The dates are mysterious, especially as the pottery was found inside the sarcophagus chamber, but they may refer to events in the life of the cow. It is not a far cry from this description to that of E, F or H in *The Apis Papyrus*. Unfortunately it is not known to which type of jar they belonged, except that it was a storage jar.

	Centimetres. h.	d.	b.
One of the Dynastic jars measures	41·0	27·8	09·0
The other	40·3	20·0	10·5

By induction we get for the first of these a unit of 6·85, with a height—depth ratio of 6/4, for the second a unit of 8·05, with a ratio of 5/2½.

The average of class 81 is	40·9	24·3	11·8
The average of class 82 is	46·0	30·7	13·3

81 yields a unit of 8·15 with a ratio of 5/3 and 82 a unit of 7·7 with a ratio of 6/4.

Miscellaneous 30 is	48·2	29·2	32·0
Miscellaneous 2 is	38·0	68·5	68·0

These yield units of 8·0 with a ratio of 6/3½ and 7·6 with a ratio of 5·9 respectively.

A mean of these results gives a unit of 7·72±·1cm. Pottery is practically ametric, the method of manufacture being probably less metric than that in any other craft. In addition, if it be attempted to make pots to measure, considerable difficulty arises, though it can be done. From the evidence of *The Apis Papyrus*, this is special pottery, made to specification on rare occasions, perhaps every quarter of a century—a much more difficult matter for the potter than turning to the same size a number of shapes with which he is familiar. It will be noticed that in these calculations notice has been taken only of the " height " and " depth " measurements. In all cases except M 2 and M 30 a glance at the pot-shapes from the Bucheum is sufficient to show that the " breadth " measurement, or width of the mouth, is not comparable with the measurements in *The Apis Papyrus*. All the pots in the latter must have been straight-sided or bell-shaped, a form very rare in the Græco-Roman period, and not common in the Twenty-sixth Dynasty, apparently the date of the customs referred to in *The Apis Papyrus*, from the mentions of Apries and Amasis. (Unfortunately the scribes who copied out that document did not fill in the space left for a drawing of each pot.) It is suggested that the potter made the pots as nearly as he understood the dimensions, but boggled at anything so outside his experience as a wide mouth for a storage jar. Anyone who has tried to persuade a village craftsman in England to make something in " the wrong way " will appreciate the strength of this argument.

Assuming that 7·72 was the unit used, it remains to discover the relationship, if any, with a known unit. The Assyrian palm, 7·61cm. (of the 7-palm version of the cubit), falls just within the probable error of our unit, but it is an unlikely measure and gives very unsatisfactory correspondence with the figures of *The Apis Papyrus*. Now, one-sixth of the Greek Olympic cubit, found in the architecture of the Bucheum from the time of Ptolemy II onwards, is 7·71cm. and this is probably the unit which is required. This cubit is probably a Greek introduction,[1] not a dynastic unit, as was once believed, and the fact that it is subdivided into 6 palms and 24 digits, is further evidence against the latter hypothesis, for the duodecimal division of the cubit was an introduction from abroad. If these inductions are correct, the foreign unit was

[1] See p. 46.

used slightly earlier in the manufacture of pottery than it was in building, and this is quite a reasonable sequence of events, seeing that the pottery craft is ametric, and would therefore be free from conservative objections to the use of a new measure.

The cubit referred to in *The Apis Papyrus* must have been divided into 6 palms, as 1⅓ Divine cubits is mentioned, which would be nonsense in a 7-palm cubit, and the subdivision is certainly into palms and digits. (There is, however, a puzzling reference to a third of a cubit in the Rhind Mathematical Papyrus.)

This would then equate the Divine cubit with the Greek Olympic cubit in Ptolemaic time and with the Short cubit prior to that date. But unfortunately these units are not found throughout the Bucheum and Baqaria, so the results cannot be considered as conclusive.

The correspondence with *The Apis Papyrus* is not so close as might be desired, but considering the special nature of pottery the variations are explicable. Moreover the pottery is not the actual pottery mentioned in the papyrus, but only pottery, which might be expected to resemble it fairly closely, made in a different place at a different time.

The following table summarises the result :

Bucheum Pot.	*Size in D.cs.* h.	d.	b.	*Apis Pot.*	*Specification.* h.	d.	b.	*Use.*
Dynastic 1	1 D.c.	4 p.		F.	1 D.c.	5 p.		Water and oil from the purification of the entrails.
,, 2	5 p.	2½ p.		E.	5 p.	4 p.		Contents of entrails.
Class 81	5 p.	3 p.		E.	5 p.	4 p.		As above.
,, 82	1 D.c.	4 p.		F.	1 D.c.	5 p.		As above
M 3c	1 D.c.	3½ p.	4 p.	S. or T.	1 D.c.	4 p.	3 p.	Purification of *krs*.
					,,	,,	4 p.	Do. of Horus copper.
M 2	5 p.	1⅓ D.c.	1⅓ D.c.	U.		1 D.c.	1 D.c.	Pitch for the Horus copper.

From the evidence of the Demotic ostraka describing the contents of jars, and from an analysis, it is clear that the large amphoræ were used for bringing in consignments of myrrh, natron and incense. Also probably for salt. It seems that occasionally pots of the type 82 or of a similar form were also used for this purpose.

The lamps and lamps on stands, 56 and 57, were probably in the nature of religious offerings, like the candles in a church, rather than for purposes of illumination, though the latter hypothesis is possible, as they may have been lit to guide those making the other offerings. The lamp-stands, class 58, explain themselves. Classes 61, 62 and 63 are all incense burners and in most cases were blackened from fire in the interior. One of them contained a residue of the original offering, and Dr. A. F. Hallimond reports upon this :

" Burnt offering from a tomb of Buchis. A dark-brown fragile material with conchoidal fracture. One of the pieces bears the impress of a platter. It has evidently been fused and has frothed. A corner of one of the pieces burns readily, with a smoky flame, frothing and giving an aromatic smell (not that of amber), leaving a cindery residue. In powder the material is brown and translucent, with a certain amount of angular mineral matter, probably accidental impurity. No doubt a vegetable resin."

Of the pottery deposited in front of the stela, such as the lamps, incense burners and one or two sundry vessels, there is, of course, no mention in *The Apis Papyrus*, as these were not connected with the ritual of the bull's mummification.

The evidence of frequent rebuilding and re-arrangement of the stelæ tends to prove that many groups of pottery were not contemporary with the burials, but were replacements.

The uses of the various pots from the Baqaria Roman Village need no special comment. Where the use is known it is indicated at the top of the class ; elsewhere it is impossible to do more than guess at the purposes of the various forms.

Decoration.—Four complete decorated pots were found attached to burials and four more loose from the Bucheum. Most of the examples of decoration were found on sherds from the Baqaria Roman Village. These are illustrated on Pls. CLVII to CLX. The most interesting object is the elephant's head in high relief. The commonest relief pattern is an imitation raised rope. The painted designs fall into two main classes—the floral and the geometric. In the former the vine seems to be the basis of most of the patterns ; in the latter a criss-cross design predominates, followed closely by various straight lines in different colours. The various spirals are interesting and some of them were on fine ware which might well have been an importation.

Potmarks.—(Pls. CLV–CLVI.) There were no potmarks on any of the tomb pottery. Of the four Bucheum X examples, three, which are fragments of Greek writing, were probably intrusive, belonging to robbers. The other might be contemporary. The only mark we can interpret for certain is the offering table, Nos. 6, 7 and 8. The winged disk is suggested for Nos. 1–5. Some little trouble seems to have been taken with a number of the potters' marks, Nos. 45–63, see particularly Nos. 46–49.

Dr. Frankfort mentions that during his season's work he discovered forty-five decorated sherds.

Miscellaneous Objects.—These are all shown on Pl. LXXXII. The most interesting is the stela chest, from Baqaria 29. It is about 80cm. high, 80cm. wide at the flat end, the end which was nearest the burial, and 105cm. long (dropping a perpendicular from the apex of the triangle to the base).

This chest dates to the time of Diocletian and there is naturally nothing like it described in *The Apis Papyrus*. It was a substitute, during a very poor period, for the passage in front of the tomb, or, better still, the vault for offerings attached to Bucheum 10. It was made in two parts, the upper half being jointed to the lower. The pottery was poor and lightly baked, being black in the middle. The flat end had two diagonals scratched across it, the purpose of which was not apparent. The jointing can be seen clearly in the photograph. Fig. 6 of the same plate shows the face from the pottery coffin which contained the painted cartonnage fully published in *J.E.A.*, Vol. XVII, 1931, on pp. 223–232 and Pls. XXXIX–XLVII.

Fig. 2 is part of a pottery dog from the Baqaria Roman Village, from which the tail and head were unfortunately missing. Other tails and heads were found which did not fit the example. Of the other fragments of figurines little need be said ; specimens were found of the coarsest, and of reasonably fine workmanship. The middle object in Fig. 5 represents the load on a camel. The last subject in this figure, the pottery Hathor head, is unusual, and may have some bearing on the relationship of the mother of Buchis to that goddess.

One or two typical examples of Bucheum pottery, a lamp with stand, an open lamp, and some dishes are at the Chadwick Museum, Bolton, and the small figures are at the Central School of Arts and Crafts, Southampton Row, London, with the exception of the Hathor head, which is in the Cairo Museum.

O. H. M.

CHAPTER IX

LAMPS

THE " open saucer lamps " and the " lamps on stands " have been described with the other pottery. They appear on Pls. CXXXIX–CXL in the corpus, and in their groups on Pls. CXXVII–CXXXIII. Mention of them will be found in the text of the Pottery chapter, p. 184 ; and on p. 189 their purpose is discussed. The bronze lamp from the Baqaria burial is referred to in the chapter on Metal, p. 103, and a drawing of it appears on Pl. LXXXIX, Fig. 3.

In addition to the above there are a number of Roman lamps of the closed type with a spout and a central hole for filling. Photographs of these are on Pl. LXXXI. For classification purposes Prof. Petrie's *Roman Ehnasya* was used and has provided information for dating the lamps. Type numbers in Roman print are Petrie's original numbers and mean that the lamp is of the same type in essentials as the specimen numbered by Petrie, though not necessarily identical with it. Type numbers in italics are those given by us where the lamp is intermediate between two specimens in *Roman Ehnasya*. The lamps are referred to here as Fig. 2, 13, Fig. 5, 3, etc. ; the numbering runs from left to right and the rows are taken from top to bottom.

The most important specimens are those shown in Fig. 4, 1–8, and with the pottery with which they were associated in Fig. 6. This group came from Baqaria 29, and was found in the pottery chest together with the uninscribed stela. Their types are : 1, F.12 ? (III Cent.) ; 2, Do. ; 3, F.12 ; 4, L.80 (IV Cent.) ; 5, Do. ; 6, not typable ; 7, V.19 ; 8, not typable ; (9, which belongs to the Baqaria R.V., is type V. 90b). There are thus two lamps of the Fourth Century and three of the Third, one only being certain. In other words, they give a date for the burial at the turn of the century, or about the reign of Diocletian, which is the most probable date for the burial from other evidence.

The five lamps in Fig. 5 were found unassociated in the Bucheum. Their types are : 1, E.80 (IV–V Cent.) ; 2, E.44 (IV Cent.) ; 3, E.70 (IV–V Cent.) ; 4, Do. ; 5, *W.17* (III Cent.). Excepting 5 (of which top and bottom views are given in the photo), it will be seen that they all belong to the period when the Bucheum was completed, even if occasional burials were being carried on elsewhere, and this, combined with the fact that none was found attached to any burial, makes it probable that they belonged to robbers. The fact that four of them were broken confirms this view, since unbroken lamps would not often be dropped by robbers, but would frequently occur in burials.

The rest of the lamps come from the Baqaria Roman Village. The typing of Fig. 1 is as follows : 1, *U.53* ; 2, Do. ; 3, *U.54* ; 4, U.55 ; 5, *E.26* (IV Cent.) ; 6, E.7 (III Cent. ?) ; 7, *E.9a* (III Cent. ?) ; 8, *E. 20* (III–IV Cent.) ; 9, B.4 (III Cent.) ; 10, *E.65a* ; 11, *L.78* ; 12, *S.70* (before Constantine I). Of these Nos. 1, 2, 3 and 7 come from R.F., and No. 5 from R.C. (the stone

enclosure), but unfortunately there is no dating evidence for the types to which these examples belong.

Fig. 2 Typing : 1, *F.24* (III Cent.) ; 2, F.12 (III Cent.) ; 3, *V.100* ; 4, *P.50* (IV Cent. ?) ; 5, U.35 (IV Cent. ?) ; 6, too fragmentary to type ; 7, L.80 (IV Cent.) ; 8, *H.31* ; 9, S.46 (III Cent.) ; 10, *Q.27* (IV Cent.) ; 11, *S.45* (III Cent.) ; 12, apparently no type in *Roman Ehnasya* from which this might have devolved unless it be called *M.29* ; 13, F.77 (III Cent.)—this lamp has a maker's mark of a pentagon incised on the base ; 14, *M.43* ; 15, base only, not typable. No. 3 comes from R.A.V., but belongs to an undated type ; 5, from R.A., is probably IV Cent. ; 7, IV Cent., is from R.A.B. ; 8 is from tomb 203 (see *J.E.A.*, Vol. XVII, pp. 223–232)—being placed in the photograph in the same way as the other lamps, the face of Bes is upside-down (in this tomb there was also a lamp with the head of Aphrodite, which has subsequently been stolen) ; 11 is from R.F. and is III Cent. Since it came from inside the temenos wall it may have belonged to the Baqaria before the village was founded.

Fig. 3 Typing : 1, U.35 ; 2, E.24 (III Cent.) ; 3, Do. ; 4, *L.86* (IV Cent.) ; 5, E.24 (III Cent.) ; 6, V.38 ; 7, V.80 ; 8, U.35 ; 9, *V.35a* ; 10, *F.69a* (III Cent.) ; 11, *V.53f* ; 12, E.29. All these lamps were found loose in the Baqaria Roman Village, so the evidence of their dating is not of great importance. It is, however, interesting to notice that four examples are Third Century, which supports the evidence of the coins that the village was beginning to be built before the beginning of the Fourth Century, however unlikely it may seem that burial 29 should have been placed on the side of the village opposite to the Baqaria.

O. H. M.

CHAPTER X

FAÏENCE

OBJECTS in faïence were not numerous, nor were those found of great importance, with the exception of the green *nms.t* jar. This is inscribed : " Son of the sun, Lord of Diadems, Nekhthorheb, Mery-Amūn, Beloved of the Osiris Buchis, given life " (Pl. LXXXIII, Figs. 1 and 2). This was the first object from the funerary furniture of burial 10 to be found. It was buried in the dump-heaps close to the spot where the *kbḥ* vase, the large situla, and the stone jar were found. Careful examination showed that there was, unfortunately, no true stratification here. The rubbish consisted largely of broken-up brick, which, as far as we could tell, came from the collapsed vault of the offering chamber outside 10 ; but this was interlarded with a certain clay which occurs in the Bucheum only above burials B and C. The tip was thus a mixture of material from Roman excavations for new tombs and rubbish from restorations undertaken at the same time. The *nms.t* jar shows that the furnishings of the Nekhthorheb burial were of a high order, and, since they were found in the same rubbish, indicates that the *kbḥ* and similar objects belonged among these furnishings. No equivalent objects were found attached to any of the other burials, nor was there any place where they could have been stored, for 10 is unique in possessing an offering vault. A *nms.t* jar is not mentioned in *The Apis Papyrus*, but only *nms* stuff, probably a liquid or an ointment, and " the *nms* cloth of the head (of the bull)." Such an object is to be expected, however, from any fully equipped burial, which would contain four *nms.t* jars and four *ḏsr.t* jars.

On the same plate, Fig. 4, among other glazed objects, are six fragments from miniature sets of purification vessels. These also came from the rubbish near the Bucheum entrance, without having any significant provenance, and the same applies to the objects in Fig. 6. In the latter photograph the second from the left is a miniature *nms.t* jar. The right-hand vessel contains resin. These objects are all blue glaze. For the use and significance of these vessels and of the *nms.t* jar see Chapter XVI, " Ritual Significance of the Funerary Objects " p. 132. In the bottom left-hand corner of Fig. 4 there is also a drop of glaze, probably waste, and two fragments of blue glaze vessels. On the right side is a portion of a blue glaze disk which may be a section of a lid. At the top left-hand corner is the glass pupil of an eye, which, in its highly patinated condition, was mistaken for a faïence object. Just above the scale is a rhomb of alabaster, which should have been included among the stone objects. Its use is discussed in Chapter XVI.

Figs. 3 and 5 show a selection of the better fragments of blue glaze found in the Baqaria Roman Village. There are portions of various vessels, both circular and angular, a part of a sphinx, and two objects like the ends of crocodile tails.

It was not considered necessary to have examinations made of this glaze, since at the present time both Mr. Beck and Mr. Lucas are engaged on a study of Egyptian faïence and glazes and any previous report on the above specimens would be redundant. Mr. Beck informed us that the glaze is a copper glaze on a basis of ground quartz. O. H. M.

FAÏENCE

Pl. & Fig.	Provenance	Size[1] Centimetres	Description	Distribution
LXXXIII 1 & 2	Bucheum dump	14·2 × 16	Jar. Green. Inscribed for Nekhthorheb and Buchis	Cairo.
3	Baqaria R.	c 5 × 5	Tray. Blue with leaf design fading to yellow.	Central School of Arts & Crafts, London.
	,, R.	c 9 × 9	Sphinx. Blue. Male. (IVth cent. A.D.?)	Buried.
			Dish. Blue crosswork pattern.	C.S. of A.C.
	,, R.	c 3 × 4	Crocodile's tail. Green with black spots. ,,	,,
	,, R.	6 × 2·5	? Unknown object. (Dynastic)	,,
	,, R.	3·5 × 2·5	Base of Bes. Blue. (IVth century A.D.?)	,,
	,, R.	c 5·5 × 4·5	Bowl. Blue, Shown joined in Fig. 4	,,
	,, R.	4·7 × 9·5	Tray. Blue, Decorated with knobs. (IVth century A.D.)	,,
	,, R.	c 11 × 17	Rectangular dish. Blue, underside rough.	,,
	,, R.	c 5 × 7	Dec. bowl (?) Mauve & translucent. Top-view is in Fig. 4. No. 2.	,,
	,, R.	c 3 × 6	? Blue. (IVth century A.D.?)	,,
	,, R.	c 5·5 × 7	Rim of bowl. Blue. Probable diameter 17cm.	,,
	,, R.	c 4·5 × 7·5	Base of rectangular dish. Blue. (IVth century A.D.?)	,,
	,, R.	c 7 × 8·0	Female figure. Green faded to brown. (Ptolemaic)	,,
	,, R.	4 × 3	Worn.	,,
4	,, R.	c 3 × 10	Decorated bowl. Green, blue, mauve,—translucent and yellow.	,,
2 ,,				,,
	,, R.	2·7 × 2·5	Bead. Blue.	,,
	,, R.	4·7 × 10	Bowl. Blue-green. (IVth century A.D.)	,,
	,, R.	5·5 × 5·8 × 3·2	Face of Bes. Deep blue.	,,
	,, R.	4·5 × 10·2?	Bowl. Blue. (Probable diameter 10·2cm. see above.)	,,
	,, R.	4·5? × 3	Staff ? Blue-green. Inscribed hieroglyphs? (Dynastic ?) (IVth century A.D.)	,,
	,, R.	2·5 × 8	Trapezoidal dish. Blue.	,,
	Bucheum X.	— —	Pupil of eye. Inserted in the photo in error. (IVth century A.D.)	,,
5	,, X.	c 2 × 3	Miniature toilet pot. Green. Broken off stand.	,,
	,, X.	2 × 1·9	,, ,, ,, Green. Broken off stand.	Buried
	,, X.	1·5 × 2·5	,, ,, ,, Blue. Broken off stand.	,,
	,, X.	c 1·5 × 2·5	,, ,, ,, Blue.	,,
	,, X.	c 2 × 3	Bowl. Blue.	,,
	Bucheum O.R.	c 2 × 3	Miniature toilet pot Blue.	,,
	,, X.	4 × 2·5	,, ,, ,, Blue, bright. Complete.	Cairo.
	,, X.	4 × 3	,, ,, ,, Green. Broken off stand.	,,
	,, X.	1 × 9·5	Disk. Blue. Rather coarse.	C. S. of A.C.
	,, X.	c 4 × 4	Bowl. Blue.	Buried
	,, X.	2 × 3	Drop. Blue. Possible waste only.	C. S. of A.C.
	,, X.	— —	Limestone rhomb. Inserted in this photo in error.	
6	Superstructures ?	1·5 × 1·5	Miniature toilet pot. Blue. Broken off stand.	B.M. 59468
	Bucheum X	3·25 × 3·25	Miniature *nms.t* jar. Green. Broken off stand. (Found 1928/29)	B.M. 59470
	Superstructures	2·5 c 4	Miniature toilet pot. Blue.	B.M. 59469
		2·7 × 6	Miniature toilet pot. Blue. Whole.	B.M. 59467

[1] c = *circa*.

CHAPTER XI

GLASS

By D. B. Harden

No complete pieces were found. The fragments, which number upwards of seventy, have been classified into fabrics and types according to the system elaborated in the catalogue of the glass-ware recently excavated by the Near East Expedition of the University of Michigan[1] at Karanis in the Fayyum.

Fabric 1 :

2 fragments of small inverted piriform flasks, types as K 571 and 587.

Fabric 2 :

Tubular base ring of shallow bowl, type as K 120.
Fragment of shallow bowl with cut decoration, type as K 209.
Tubular base ring of deep bowl, type as K 244.
Rim of beaker, type as K 365.
Fragment of goblet with festoon decoration, type as K 420.
Top of flask, inverted piriform type, with blue-green coil beneath rim, type as K 516 ff.

Fabric 3 :

Fragment of rim of bowl, yellowish colourless, type as K 117 ff.
2 fragments of base-rings of shallow bowls, yellowish colourless, type as K 83 ff.
1 fragment of base-ring of shallow bowl, yellowish colourless, type as K 89 ff.
1 fragment of base-ring of shallow bowl, greenish colourless, type as K 89 ff.
Fragment of rim and side of deep bowl, greenish colourless with trace of blue blobs, type as K 331.
Base of thumb-indent beaker, greenish colourless, type as K 394.
Fragment of side of goblet, buff colourless, with scratched decoration, type as K 426 ff.
Base of conical lamp, greyish colourless, type as K 455 ff.
Fragment of body of flask, with honeycomb mould-blown decoration, greenish colourless, type as K 630.
Fragment of top of body of cylindrical jug with scratched decoration, greenish colourless, type as K 739 ff.

Fabric 4 :

Base of conical lamp, green, type as K 455 ff.
Rim and neck of jar, yellow, type as K 499 ff.
Fragment of neck of jug, yellow, with greenish coils, type as K 720.

Fabric 5 :

Fragment of rim and side of shallow bowl of a type not represented at Karanis. Greenish yellow, plain-cut rim, short vertical sides, rounded base. Diam. about 0·20m.
2 fragments of rims of shallow bowls, green, type as K 117 ff.
Fragment of base of deep bowl, green, type as K 228 ff.
Fragment of side of deep bowl, brownish yellow, type as K 246 ff.
Fragment of rim and side of deep bowl, honeycomb mould-blown design, yellowish green, type as K 333 ff.
Fragment of side of goblet, yellow, with scratched decoration, type as K 426 ff.
2 fragments of rims of lamps, greenish yellow, with wheel-incisions, type as K 455 ff.
1 fragment of rim of lamp, green, with wheel-incisions, type as K 455 ff.

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[1] D. B. Harden, *Roman Glass from Karanis*, University of Michigan Studies, Humanistic Series. In the press. For the description of the fabrics see the introduction to that work.

1 fragment of body of lamp with wheel-incisions, yellow, type as K 455 ff.
Base of lamp, yellowish green, type as K 455 ff.
Solid base-coil of lamp, green, type as K 464.
Fragment of rim of cup with spiral threads, yellowish green, type as K 482.
Fragment of stem of do., green.
Coil-base of flask, green with dark green coil, type as K 645 ff.
Fragment of body of cylindrical jug, green, type as K 736.

Fabric 6 :

Fragmentary pad-base of shallow bowl, type as K 83 ff.
Tubular base-ring of deep bowl, type as K 260 ff.
Concave base of flask, type as K 594 ff.

Fabric 7—No examples.

Fabric 8 :

Tubular base-ring of deep bowl, green, type as K 242.
Base of inverted piriform flask, greenish, type as K 516 ff.
Rim, neck, and part of handle of jug, greenish, type as K 729.
Rim, neck, and part of toilet bottle, green, type as K 797 ff.

Fabric 9 ; 20 examples, all from toilet bottles of Class XIII, among them several examples of type A, one each of types D, E, and F, and the rest uncertain.

Other fabrics :

1. Fragment of turquoise-blue sand-core ware, (?) Ptolemaic or earlier.
2. Fragment of pillar-moulded deep bowl, green, type as K 310. First century A.D.
3. Fragment of small flask, deep greenish blue, fine ware. First century A.D.
4. Fragment of small unguent flask, greenish colourless, ovoid body with pointed base, type as Edgar, *Græco-Egyptian Glass* (Cat. Mus. du Caire), No. 32712. Sixth–seventh century A.D.
5. Fragment, shape as No. 4, but deep green glass with cut decoration. Sixth–seventh century A.D.
6. Fragment of base of flask, brown, with mould-blown design. (?) Tenth–twelfth century A.D.

From the above analysis it will be seen that with the exception of one fragment of Ptolemaic or earlier sand-core ware and three fragments of early Arab date, almost every piece can be paralleled by one or more examples from Karanis. The Karanis glass is divided roughly into two groups—an earlier, comprising fabrics 1, 2, 8, and some pieces of 9, which date from the second and early third century ; and a later, comprising fabrics 3–7 and the remainder of 9, which date from the mid-third to the fifth century. The proportionate frequency of the fabrics is roughly the same at Armant as it is at Karanis. Taking the glass evidence by itself, therefore, it would have seemed likely that the period of intensive occupation of the strata at Armant in which the glass was found extended from the second to the fifth century. But this conclusion is strongly at variance with the evidence of other finds, notably that of the coins and lamps, both of which argue for intensive occupation in the latest third and in the fourth century only.

Now at Karanis one of the greatest difficulties in dating the glass arose from the fact that vessels—especially those of the better wares—were often kept for centuries, and fragments of fabrics 1 and 2 (second or early third century) were repeatedly found in fourth–fifth century houses. It is quite likely that something similar happened at Armant, and that the fragments of glass belonging to the second or early third century represent heirlooms brought from elsewhere by the settlers when they came to Armant in the late third century. The dating of a site by means of glassware is full of pitfalls, and such evidence cannot be set in the balance against that of coins and other more trustworthy criteria.

All these fragments of glass are in the Ashmolean Museum, Oxford.

D. B. H.

CHAPTER XII

METAL

SECTION I, GENERAL OBJECTS.

Cleaning.—Before proceeding to a discussion of the objects, it may be worth describing the method of cleaning employed for the specimens shown on Pls. LXXXIV to XCI.

Though a solution of Rochelle salts (potassium sodium tartrate) and caustic soda is tolerably effective for coins, where the finish of the surface is unimportant, the use of a scratch-brush, necessary in this treatment, is not ideal for most objects. Prof. Baly, of Liverpool University, recommended the use of sulphuric acid as being harmless to copper or bronze. This was made up as a 25 per cent solution in water (the strength used by present-day metal-workers) and used cold. The objects were immersed in the solution, taken out at intervals, washed, and cleaned with a stiff nail-brush. If still bearing a quantity of red or green oxide, they were re-immersed and left until no corrosion remained or only a residue of black oxide. If quite clean, they were washed until free from acid. To discover if acid were present, the objects were left in water for twenty-four hours, and, at the end of that time, the water was well stirred and tested with B.D.H. Universal Detector, which shows the presence of as little as one part in eight million of acid or alkali. If, however, a black corrosion remained, they were, after a thorough washing, put into the Rochelle solution (ten parts caustic, twenty-five parts Rochelle and a hundred parts water), and cleaned with a nail-brush. This method cleaned all but the worst specimens. With the latter a scratch-brush was sometimes necessary, but, in any case, the use of acid greatly accelerated the process. In the case of coins it is helpful to have meshed enamel trays supporting them in the solution ; this has the double advantage of allowing the loosened corrosion to sink to the bottom of the dish, thus leaving the coin clear for further action by the mixture, and of exposing both faces of the coin to action. The above method saves about twenty-four hours with each batch of coins to be cleaned. The washing process is particularly important, for if any sulphuric acid be left on the metal, the action of the atmosphere upon it will be harmful to the object.

A few coins were found in which the corrosion seemed to form itself into a re-deposit of copper which could not be removed even with a scratch-brush. These were mostly cases in which the coin would normally be discarded as past treatment. As a rule, heating in sulphuric acid removed this patina, but, if not, the coin was heated and plunged into the acid, when the accretion either split away in the heating or plunging, or was rendered amenable to the normal process. This method was used only when all else failed.

Some interesting results of this process can be seen in the photographs. The third flat dish on Pl. LXXXVI, fig. 4, shows a scratched surface, and these scratches were made anciently

when the dish was cleaned with sand. The surfaces of the *kbḥ*-vase and of the large situla are also good examples of what was achieved.

The metallurgical analyses of the objects by Mr. Brazener, of the Elliott Metal Works, Selly Oak, Birmingham, and by Prof. C. O. Bannister, of Liverpool University, are given on pp. 105–113.

The most impressive metal object found was the large situla, which, apart from being a beautiful piece of engraving, has other sources of interest. The whole object is shown in Pl. LXXXIV, Fig. 4, and four views of the inscription on Pl. LXXXV. In addition a drawing of the object and of the inscription are given on Pl. CLXI, Figs. 1 and 2. The text is translated in Vol. II, p. 22, and it will be seen that the situla is dedicated to a scribe of Amun, Petemestous, by his son Amenhotep. Petemestous' wife was the lady *Nhm s R'-t3.wi'*. In the British Museum are the mummy and cartonnage of Horemheb, son of Petemestous, priest of Mont, unfortunately the result of pillage and without provenance. The cartonnage is of a similar type to those coming from Armant, one of which is published on Pl. CXa. (See also *J.E.A.*, Vol. XVII, pp. 221–232, Pls. LVI–LVII.)

These cartonnages belonged to priests of Mont and their relatives, and, although the owner of the situla was scribe of Amūn, it is not improbable that he belonged to the same family as the priest in the British Museum. Research was made by Baly into the records of persons named Petemestous and their relatives. Several other persons of this name were found but it was not possible to trace any connections between these and the owners of the cartonnage and the situla or their relatives. Neither was it possible to connect them with any names from the Armant cartonnages.

The scenes represented are conventional enough—on one side Petemestous offering to Osiris, Horus and Isis, and on the other Horemheb making offerings to his deceased parent ; but a human touch is added by Petemestous' dog, Nefer, standing beside his chair. Mr. G. W. Murray, of the desert survey, tells me that this animal closely resembles the ' Prick-eared Greyhound ' kept by the Bisharin.

An unusual feature is the engraving of the feet, which are portrayed realistically, and not both alike, as is usual in Egyptian art.

Mr. G. T. Friend, instructor in metal engraving at the Central School of Arts and Crafts, examined the photographs and commented on the very high quality of the workmanship, which, he pointed out, was especially evinced in the management of the long parallel lines which represent the pleats of the dresses. He also said that there could be little doubt that the ring of stars round the top were done by an inferior workman, possibly an apprentice. It is noticeable that parts of the figures have been lightly modelled, whereas the smaller objects are delineated only.

What connection, if any, there is between this situla and the Bucheum it is impossible to say. It was found in the ancient dump-heaps close to the *nms.t* vase of Nekhthorheb which must, undoubtedly, have belonged to burial 10. Several other objects, the *kbḥ*, the cup, the flute and the limestone jar were also in this deposit and they probably belonged to the same burial, but there seems to be no connection between the situla and the burial, unless it was a re-used object. Possibly the Bucheum was dug on the site of an earlier tomb from which this was thrown out.

The small situla, Fig. 3 of Pl. LXXXIV, was found nearer the Bucheum entrance under O F and O G, and does not belong to the same deposit. The object does not show the same quality of carving as the last and may well be Ptolemaic or Roman in date. An unknown person

is shown offering to Min, Horus (?), Isis (?) and Nephthys (?). No connection can be traced between this and the Bucheum, though it may belong to the site.

The third figure on Pl. LXXXVI is a photograph of the *kbḥ* found in the same heap as the large situla. This object is exceptionally interesting, as it appears to be the only full-sized example in existence, although the *kbḥ* is one of the most frequently mentioned and represented of ritual vases, and cannot have been at all a rare object. A bronze cap from the tomb of Tutankhamūn is believed by Dr. Howard Carter to have belonged to one of these vases which was stolen by the robbers. The theft of a *kbḥ* vase by thieves who wanted apparently nothing but the richest objects suggests that some great value was attached to it, though it is difficult to imagine in what this value consisted. Perhaps the vase contained a rare oil or other valuable liquid, though, from the inscriptions, water would be the more likely content.

Pl. LXXXVII, Figs. 1 and 2, are two views of the bronze cup. Though the exterior of this vessel was badly corroded in places the interior was exceptionally free from patina of any sort and at the bottom entirely so, as can be seen in Fig. 2 where the hammer marks are clearly visible. The vertical scratches on the outside may belong to the finishing of the vessel, but are more likely to be traces of vigorous cleaning with sand in ancient times.

The lower two of the three flat plates, photographed together in Fig. 4 of Pl. LXXXVI, were found in the area of the *nms.t* jar and the upper example outside the entrance of the North bay. None of these three showed any signs of having contained burned offerings, but Dr. Frankfort reports finding another example, much corroded, which contained charcoal. It seems probable, at least, that they were for some kind of offering, and may be the forerunners of the pottery plates of types 7 and 16 which were found in such numbers. The interior of the left-hand lower example is exactly as it was found, quite unpatinated and with the appearance of having been used for a liquid, whereas the right-hand example shows, after cleaning, the fine scratches from the sand cleaning which it underwent originally.

Apart from these plates we can safely attribute to the Bucheum the small bottle inscribed " Beloved of Osiris Buchis." (Pl. LXXXVIII, Fig. 2 first object.) This is in Cairo and has not been analysed, but appears to contain a very high proportion of lead. With the exception of the Horus copper, referred to below, all the metal objects mentioned in *The Apis Papyrus* occur on Pl. XV (of Bergman's publication of that document), the translation of which is very fragmentary. They are : " Five copper dishes full of water to their . . ." (These might be the plates referred to above but this is improbable and a more likely suggestion is made below): " An ebony dish rimmed with gold, 1 Divine cubit " and " a *gml* of copper." If there were any indication as to its size and nature, by a process of elimination it might be possible to equate the last-named object with the bottle, but there is no such description. The bottle was found with the other objects in the old rubbish heaps and may reasonably be attributed to the burial of Nekhthorheb.

The flute, shown on Fig. 3 of Pl. LXXXVIII, may perhaps have been used in processions. A full report upon it from the musical aspect is given by Miss Schlesinger on p. 103, and the material has been analysed by Mr. Brazener. In view of the analysis of the solder it must be admitted that there is a possibility of the object being later than the Bucheum in date. It was found in the rubbish heaps where the other objects were found, and these heaps were shallow and impossible to stratify, but there were no other late objects or suggestion of interference in the heaps, and it seems an unlikely proposition that a robber should dig in the Bucheum rubbish

heaps and leave there a musical instrument. No such instrument in metal is known among the Egyptians to-day, but I have been unable to establish whether such existed in the medieval period. The balance of archæological evidence is heavily in favour of the object belonging to the time of Nekhthorheb or thereabouts. Miss Schlesinger's results favour a similar conclusion.

The shovel (Pl. LXXXVIII, Fig. 4) requires little comment. It is a very ordinary piece of workmanship and was found in the large dump-heap to the north of the Bucheum entrance, at a higher level than the Anubis head and the wooden Ibis. In making a facsimile of this tool in copper, with the assistance of Mr. Adams of the Central School of Arts and Crafts, we noticed that the marks of manufacture on the ancient tool were almost identical with those on the facsimile, thus indicating that the method of manufacture was the same.

At the north end of the North passage, the roof had collapsed, or had been broken in, and in the cavity of the passage there was a pyramid of debris, reaching up to the surface. Down the side of this were found the two hemi-spherical objects with spouts, Pl. LXXXVI, Figs. 1 and 2, the three shallow cylindrical dishes in Pl. LXXXVII, Fig. 3, and the two retractors shown together with the flute on Pl. LXXXVIII, Fig. 3. All these objects had evidently been thrown, or had fallen down the cavity, and, although they did not form a closed group, there was little doubt that they all belonged together. There are three possible explanations of their presence. They may have been thrown there at any period subsequent to the collapse of the roof, the cavity being regarded as convenient for the disposal of rubbish. There may have been some construction, containing the bronzes, above this end of the Bucheum and they may have fallen down during a collapse. Lastly it is possible that robbers brought them up from the Bucheum by this route and threw them back when they discovered, by the light of day, that they were only bronze. The first explanation is very unlikely, as there are no traces of later building sufficiently near to tempt anyone to use this hole as a rubbish shute. The second appears improbable, as no traces remain of a superstructure at this spot, though it is true that a number of the votive pebbles were found nearby on the surface. The last explanation seems the most probable.

At first we were inclined to regard the dishes and spouted bowls as part of a still, though it was difficult to connect such a thing with the Bucheum. Prof. Bannister, when examining these objects metallurgically, wrote to me that he did not regard this identification as a correct one and asked if it were possible to make any other suggestion as to their use.

Now, the most frequently mentioned metal object in *The Apis Papyrus* is the Horus copper. Though no description of its use is given, it is apparent that it was continually cleaned and purified. It is also mentioned among the objects concerned in the mummification and more especially with the cleaning of the entrails. This section of *The Apis Papyrus* is quoted in the chapter on pottery (p. 86).

We are sure, as is shown in the chapter on mummies, that the bull was not eviscerated but that purification of the entrails took place through the anus. I suggested to Prof. Bannister that the two spouted objects might be a species of enema used in this process of purification. He is strongly of the opinion that this was the purpose of the larger object, which he told me resembles closely, both in size and shape, the vessels used by veterinary surgeons to-day. Photographs of these are shown on Pl. LXXXVIA. According to Prof. Bannister the smaller object of the two resembles an instrument used by veterinary surgeons for douching the vagina in cattle. The only instrument for this purpose that I have been able to trace is a very modern one in which the spout is made of vulcanite—which bends with the blood heat to the requisite

shape. The spout is also attached to the tank of the vessel by a rubber tube and is therefore not strictly comparable, but the spout of the douche from the Bucheum is of the requisite size and shape and it seems safe to assume that this was a sister instrument to the enema and was used in the purification of the entrails of the Mother of Buchis. Prof. J. McCunn, of the Royal Veterinary College, was kind enough to examine the photographs of these instruments and to confirm the possibility of their being used as suggested here. He pointed out that the second instrument might also be used as an anal enema, one instrument being sometimes used for both purposes at the present time.

That the enema is to be equated with the Horus copper is not certain, but, bearing in mind the mention of it in *The Apis Papyrus*, it is a highly probable supposition. It is perhaps additional evidence for the two objects being identical that it was solely references in that document that led me to make the above suggestion to Prof. Bannister at a time when I was unaware either of any evidence that such a method of embalming was used, and did not know the shapes of modern veterinary enemas.

Warren R. Dawson and G. Elliott Smith (*Egyptian Mummies*, p. 62) say : " The second method of Herodotus of embalming emphasizes the use of cedar oil, which was at all times an important factor in mummification ; but although mummies without incisions and retaining their internal organs are known, we have no Egyptian evidence of the use of syringes. There is no doubt that mummies were sometimes treated in this manner, and therefore some mechanical means must have been employed to inject the oil, which could only thus have been forced through the convolutions of the intestines."

It is certain that if the process were to be effective the solutions would have to penetrate the greater part of the intestines and the pressure would hardly have been sufficient to do so with the present instrument. It will be noticed that both instruments have a double flange attached and it is possible that this was used for attaching to the top of the tank a leather bag for a bellows, thereby converting the instrument into a syringe.[1] Another suggestion was made by Prof. Bannister, who pointed out that the flanges resemble those on a crucible and that an insulating material might have been attached to those on our instruments so that they could be used with hot materials. It has not been possible to trace any information as to the temperature at which embalming solutions were used, but on p. 59 of *Egyptian Mummies* it is stated that in late mummies " bitumen " was frequently applied hot. The only trace of bitumen-like material having been used in the intestines of the mummies was noticed by Fairman in Baqaria 32, where there was a pile in the thoracic cavity of that cow, rather as if it had been poured in through the throat. Notice the use of U in the Apis pottery (p. 86).

In *The Apis Papyrus* there is frequent mention of the use of both hot and cold ingredients. The part that deals with the treatment of the anus is unfortunately obscure, but in the detailed section dealing with the treatment of the head and throat warm ingredients play a large part. There is frequent washing with warm ingredients and cold, and as frequent applications of oils, apparently both hot and cold. *The Apis Papyrus* is an obvious compilation containing two different accounts of the same processes, the first of which is much more summary in those sections which we can fairly compare, such as in the treatment of the head. It is true that there

[1] Mr. Wainwright has pointed out to me that this would produce an instrument resembling closely the bellows shown in the tomb of Rekmare'. (Newberry, *Rekmare'*, Pl. XVIII.)

is a very brief second account of treatment of the anus, but this is so very much abbreviated that there is reason to believe that the document breaks off before we come to the complete description of this process. In the treatment of the head the first account makes no mention of warm and cold ingredients but the second account gives in full detail the use of both warm and cold ingredients. In the first account of the treatment of the anus the temperature of the ingredients is not referred to but we may fairly assume that this is only missing through the incomplete nature of the account. In the account it says : " A lector goes before the anus. He must lay a cloth over himself and the god. He must take the cloth and all things that he finds therein as far as his hand can go. *He must wash it with water* and he must stuff it well with cloth."[1] (Italics ours.) This operation would be impossible without instruments similar to the retractors from the Bucheum. It is nearly impossible that the lector should have extracted the entrails themselves. In Baqaria No. 9 Fairman noticed a pad of fabric apparently from the inside of the pelvis. This was too decayed to preserve. Perhaps, like linens mentioned in connection with the head, it was soaked in " cedar-oil " and natron.

With regard to the so-called cedar-oil used in these processes, Mr. Lucas, in an article "Cedar-tree Products Employed in Mummification," *J.E.A.*, Vol. XVII, pp. 13–21, states in his conclusions : " If injected, it was probably either impure oil of turpentine or pyroligneous acid containing admixed oil of turpentine and wood tar ; if employed for anointing, it was probably volatile oil of juniper dissolved in whatever fixed oil was used to extract it. No Egyptian evidence, however, has been found for the use of any of these materials. In neither case was it a fixed oil of any coniferous tree, since no such oil was known."

Of all the materials consigned to the Bucheum, it was unfortunately possible to obtain enough for analysis of myrrh only (p. 150).

Above are mentioned the " Five copper dishes full of water to their . . ." which are referred to in the papyrus but without any indication as to their use. These might well contain the water used in this purification process and it seems reasonable to connect with these dishes the three copper dishes found with the enema and douche. It is unfortunate that no size is specified in the papyrus.

It is worth noticing that each of the pots, mentioned in *The Apis Papyrus* as being for the purification of the Horus copper, would be large enough to contain the enema if the Divine cubit be equated with any known cubit-length other than that of the lesser cubit (of about 42cm.).

The identification of the two retractors was made by Prof. McCunn. That this is their use there can be little doubt and it seems most likely that they were vaginal retractors, for use with the cows, but it is also possible that they were used in the treatment of the anus of the bull. They would also serve if any incision was made. Prof. Bannister agrees entirely with this identification.

The iron chisel and wedge (?) from Baqaria 1 were probably tools, used in the tomb construction, left by workmen upon its completion. A curious find outside 11 in the Bucheum was an amorphous lump of iron on top of the skeleton of a cat. The remains of the iron were about 15 cm. × 8 cm. × 8 cm. and it appeared that the cat had been living in the place after its desertion and had been trapped and held by this heavy lump falling on it.

[1] Prof. McCunn informs me that in modern mummification of animals the orifices are stuffed with cotton wool soaked in formalin.

A bronze lamp was found in the Baqaria outside tomb 5 and a drawing of it appears on Pl. LXXXIX, Fig. 3.

The largest quantity of metal found was the series of bronze clamps and nails which were used for fastening the bulls down to the boards on which each mummy rested. These have all been drawn and typed, and a corpus of them will be found on Pls. CLXII–CLXV. Unfortunately there is no information available about those found in the first two years, so the statistics are not so valuable as they might be. The types are arranged according to the amount of turnover of the points of the clamps. In making this corpus of clamps it was hoped that it might be possible to attach a date to a certain shape or size, which would have been very valuable indeed as clamps alone amongst the objects associated with the mummies, occurred regularly in every burial. Failing this, it seemed possible that the differently placed clamps might have to be bent differently to suit the construction of the bier. Owing to robbing and other causes, the list is too incomplete to make a final judgment, but it appears as if these objects were too crudely made to show any development or decay and that the bending of them was not a ritual process, but depended on the whim of the workman who did the job. In certain cases iron clamps were used, and it was usually impossible to type these owing to their state of decay.

Most of the heads of the bull and cow mummies were originally covered with gold leaf. A full description of this occurs with the other metal analyses.

Two bronze Osiris figures (Pl. LXXXVIII, Fig. 1), were found loose in the Bucheum during the first year's excavations. (The left-hand figure in the photograph is steatite and is included for comparison.)

The metal surrounds of the eyes are discussed in the chapter on the mummies, but an analysis of one is given on p. 108.

The few coins found in the Bucheum and the Baqaria are described on p. 116, with the coins from the Baqaria Roman Village.

There were no very important finds of metal in the village apart from the coins. The most significant were the three bronze bulls shown on Pl. LXXXIV. In Fig. 2 they are all three shown as found and in Fig. 1 the two not retained by the Cairo Museum are shown when cleaned. The other objects from the village call for little comment. The ring from R.B.G. is silver. The small object like a saltspoon, next on the plate to the arm, is in reality the lid of a metal lamp, and was originally hinged on like that in the lamp from Baqaria 5 (LXXXIX, Fig. 3). The ring on Pl. LXXXIX, Fig. 1, has been analysed (p. 108).

The provenance of the bronze figure of Buchis, B.M. No. 11581, is unknown, but there can be little doubt of the identification.

ANALYSES AND REPORTS

The Flute

By Miss Kathleen Schlesinger.

A facsimile of the original flute has been made in bronze by Mr. J. D. Coates.

The length of the original ancient specimen, now ·332 m., which was shortened at the embouchure end of the flute in the process of assaying by ·003 m. (estimated as closely as possible

from a scale photograph) has been restored in the facsimile, the length of which is accordingly ·335 m. over the holes from exit to embouchure.

The flute, from the position of the finger holes, was designed to give the ancient Dorian mode, which formed the basis of the *Perfect Immutable System* of the Theorists of the Græco-Roman period. From the exit the intervals are two-thirds of a tone, minor tone, major tone, septimal tone, therefore the fourth is sharpened.

Played from hole 1, used as vent (i.e. never closed), the mode is Hypolydian with the tritone (*tritonus diabolus*) instead of the perfect fourth. The latter, however, may easily be obtained by half-closing hole 4, or alternatively by the device of cross-fingering, viz : opening holes 1 and 4 and closing holes 2 and 3.

In *The Modes of Ancient Greek Music*, I give a formula for the computation of the modes, and when the measurements of this flute are worked out according to this formula they confirm the results of practical tests made with the facsimile instrument.

Original length of specimen from exit to embouchure over the holes ·335.

Length from centre of hole 1 to embouchure ·276.

Diameter of bore (Δ) ·013 to ·014 (estimated as nearly as possible in view of the present state of the specimen).

Diameter of bore inclusive of depth or thickness (Δ + de) .. ·016

Diameter of finger holes (δ) ·0055

Length from exit to centre hole 1 .. .. ·058

„ „ centre hole 1 to centre hole 2 .. .. .. ·029

„ „ „ „ „ 2 „ „ 3 .. .. .. ·028

„ „ „ „ „ 3 „ „ 4 .. .. .. ·026

Average for three distances from holes 1 to 4 is .. .. ·083/3 = ·0276 ± ·0004.

The average distance taken ten times for the Hypolydian mode is ·276, which is the length from centre of hole 1 to embouchure Q.E.D. For the Dorian mode the same average taken 11 times plus the end correction, or allowance for diameter : plus one increment of distance (I.D.).

$\frac{\Delta + de}{2} + \Delta + (\Delta - \delta) +$ I.D., *i.e.* $\frac{\cdot 016}{2} + \cdot 014 + (\cdot 014 - \cdot 0055) + \cdot 0276 = \cdot 0581$ which is the distance from the exit to the centre of hole 1, ·058 Q.E.D.

The pitch of the flute, when held vertically, with the breath directed downwards into the tube and impinging against the wall at about 5mm. from embouchure (N.B. *Not* played like the Egyptian *nay*) gives B 241 v.p.s. from exit.

C 265 v.p.s. from centre hole 1.

It seems clear that since the distance between the exit and the first hole has been correctly negotiated by the ancient flute-maker—no slight empirical feat, as may be seen from the items of the formula—we may conclude that by structure the flute was originally Dorian—Spondaic, i.e. a diatonic of six degrees, the sixth note being obtainable as the third harmonic of hole 2, when the harmonic register is in use.

In the opening centuries of our era, the Hypolydian mode was in favour in Hellenistic Asia, Egypt, Arabia and Syria, in both forms, with tritone and with perfect fourth.

K. S.

Metal Objects

By W. F. Brazener.

Large Situla.

(*Body*.)

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	82·49	10·08	5·62	·14	·17

Visual and microscopic examination of this specimen leads us to believe that the situla originally started as a casting in bowl-shaped form and, by very gradual hammering, with intermediate annealings, the body was beaten into the existing shape. The microscope shows a small grain size, which is the best condition of the metal for service.

It is worthy of note that the chemical analysis reveals a high lead content, and indicates that the fabricators were aware of the beneficial effects of lead additions to alloys which were subsequently to be engraved.

Handle Wire.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	86·23	11·46	·61	·20	·21

A visual examination of this reveals what are, apparently, draw lines on the wire. These are so typical of wire which has been drawn through a rather rough die that it is almost impossible to come to any other conclusion than that the wire has been made in this way. The microscope reveals small alpha crystals in the annealed condition, which shows that the metal had been cold worked and annealed many times from the original cast ingot.

It is worthy of note that in this alloy the lead content is kept down to a comparatively low level, demonstrating that the Egyptians were aware of the harmful effects of lead in alloys of this nature when considerable cold work had to be applied to the metal. It is also noteworthy that the highest tin content which is used commercially in bronze wire at the present day is between 7 and 8 per cent, so that it is quite probable that the Egyptians were content to produce this material by very laborious methods, whilst, at the same time, they must have been fully aware of the harder wearing properties with the higher tin content.

Small Situla.

(*Body*.)

Chemical analysis.

For fear of damaging the specimen no sample was taken from the body for analysis. This situla is a casting which has been dressed and smoothed for engraving, and has not been subjected to any mechanical treatment whatever. An examination under the microscope reveals quite a large lead content, which one is led to expect would be deliberately added in order to give the alloy its engraving properties. The composition, it may be assumed, is similar to that of the large situla. The craftsmanship revealed in this small specimen is of a very high order, and it would be difficult to imagine anything superior, of a similar nature, being produced at the present time.

Handle Wire.

Insufficient sample was taken from this to obtain an analysis, but microscopic examination

reveals a structure very similar to that obtained in the handle wire of the large situla, whilst the composition would undoubtedly be very much the same.

CUP.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	86·72	12·48	·28	·11	·17

This has been beaten out from a bowl-shaped casting, and the interior still reveals the hammer marks of the tool used in this operation. A microscopic examination reveals small alpha crystals in the cold-worked state. This would lead us to believe that the Egyptians were aware of the more hard-wearing properties of the alloy when left in this condition as when compared with the annealed condition.

It is also worthy of special mention that the lead content is very low. This gives further evidence that they knew the harmful effect of a high lead content when alloys of this nature had to be cold worked

SHOVEL.

	Copper	Tin	Lead	Iron	Zinc.
Chemical analysis ..	92·25	5·51	1·09	·19	·16

There does not appear to be anything very elaborate in the production of this specimen. It was probably manufactured, in the first place, from a flat slab casting, and the shaping effected by subsequent hammering with intermediate annealings. There is further evidence in these alloys of advanced metallurgical knowledge, in that the tin content is kept comparatively low, which would make the hammering to such a thinness a much easier matter than with an alloy of a higher tin content.

LARGE CLAMP.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	88·57	7·04	·76	·33	·19

It is quite probable that this has been hammered to shape from drawn wire. On account of the corrosion practically all external evidence as to its method of manufacture has been destroyed, but the microscope shows small alpha crystals in the annealed condition. It would be a comparatively easy matter to hammer a square section from a round wire, or even—if suitable dies were available—to draw the material in a square section.

SMALL CLAMP.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	86·52	8·23	2·18	·19	·32

The comments on the large clamp apply also to the small clamp.

ARMOUR SCALE.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	88·84	5·81	1·63	·30	·16

From visual and microscopic examination it is almost certain that this specimen has been hammered from a slab casting with intermediate annealings. The small hook attachment has evidently been made by threading a small piece of square section wire through a hole in the

armour scale and fixing by hammering up in rivet fashion. The evidence of the microscope reveals the material to be in the annealed, or " soft " condition, and this is rather difficult to understand, as, if the material had been left in the cold-worked condition, it would have been much harder, and considerably more impenetrable. (Due to subsequent burning ?[1] O.H.M.)

FLUTE.

		Copper	Tin	Lead	Iron	Zinc
Tube.	*Chemical analysis*	92·37	4·59	1·20	·31	·16
Solder.	Do.	2·07	61·49	32·94	·34	·95

The material of this specimen has evidently been thinned down from a slab casting. It has been cut to size, bent to shape and the joint soldered. The chemical composition reveals a comparatively low tin content, which would make the cold work much simpler and easier than with the higher tin contents found in so many other specimens. This is further evidence that the Egyptians were fully aware of the properties of the copper/tin alloys, and it is worthy of remark that the analysis of this particular material is not dissimilar from the ordinary phosphor-bronze sheet which is marketed at the present time.

The analysis of the solder is truly remarkable, as it coincides almost entirely with the best quality solder in present-day use.

It is really a noteworthy feature of this specimen that if it were being manufactured at the present time it would be very difficult to distinguish between the present-day alloys and those used in this specimen.

It is also of great interest to observe the wonderful accuracy with which the holes have been formed in this specimen, and one can only conceive of the use of some mechanical device for this purpose similar to the drilling or punching machines in present-day use.

DISH NO. 1.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis	87·40	11·31	·19	·14	·17

This has been thinned down and shaped from a slab casting. The microscopic examination reveals that a fair amount of cold work has been put on the specimen. There is no evidence of the cast structure in the specimen, and it has been left in the hard or cold-worked condition. The absence of any considerable quantity of lead is an indication that the article was not intended for engraving.

DISH NO. 2.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	92·32	6·33	·48	·25	·48

This has been produced in a manner similar to Dish No. 1, but it has not received so much mechanical treatment and, therefore, fewer intermediate annealings. This is revealed by the presence of coring in the structure, which shows that actually comparatively little work has been placed on the alloy from the cast state.

DISH NO. 3.

	Copper	Tin	Lead	Iron	Zinc
Chemical analysis ..	69·04	4·73	23·55	·28	·59

[1] But see Petrie, *Tools and Weapons*, pp. 38 and 99, and Pl. XLIII.

The composition of the alloy is extraordinary, the lead content being inexplicable, as an alloy of this composition will not withstand either cold or hot working. Apparently this was discovered, when an effort was made to beat out the casting. As this was found to be an almost impossible task, the article was left in its original cast state. The evidence for this is borne out by microscopic examination, which reveals a slightly deformed dendritic structure.

KBḤ Vase.

By scraping off a certain amount of corrosive material from the inside of the neck, it was possible for us to get half a gramme of fairly clean material, without unduly disfiguring the specimen.

Chemical analysis	Copper	Tin	Lead	Zinc	Iron
	81·24	10·24	6·60	0·50	0·14

These figures do not total 100 per cent, but this is accounted for by certain other small impurities which would be present, coupled with the fact that the sample itself was not perfectly clean and free from the products of corrosion.

A small area of the bottom of the vase was polished and etched, and examined under the microscope. This examination gave clear evidence that the vase had been cast, as the dendritic structure, peculiar to castings, was in evidence.

There were also obvious fairly large areas of the blue copper/tin eutectic. Also, the lead was prominent in comparatively large black patches. The presence of these constituents is confirmed by the chemical analysis.

The visual examination of the specimen reveals the fact that the Egyptians were troubled with minute blow-holes in the castings even as we are, on occasions, at the present time.

The evidence, from an examination of the interior, leads one to believe that the casting was made in a horizontal position with the spout lying on the side. The evidence for this lies in the accretion of metal which will be found just below the neck of the vase, and which was evidently the gate for pouring in the molten metal.

Bronze Eye Setting, Approx. 4ins. × 2⅜ins.

Chemical Analysis ..	Copper	Tin	Lead	Iron	Zinc	Nickel	Silver
	82·46	7·16	9·08	·15	·14	·02	Nil

Microscopic Examination.

The metal is in the cast state, showing a typical dendritic structure, and there is a small quantity of delta constituent present which would be due to the high tin content.

Bronze Ring, *approx. 1¼ins. diameter.* (Material approx. ⅛in. diam.).

Chemical Analysis ..	Copper	Tin	Lead	Iron	Zinc	Nickel	Silver
	66·13	8·53	24·33	·21	·24	·08	Nil

Microscopic Examination.

The metal is in the cast state, showing the typical cored structure with delta constituent. It is remarkable that such a small object should have been manufactured by a cast method.

Iron Chisel.

Chemical Analysis	Silicon	Tin	Phosphorus	Manganese
	·06	Trace	Nil	Trace

Microscopic Examination.

Although the illustration shows even-size crystals, the section examined reveals a very uneven grain size. This is evidently due to the variable amount of forging which the chisel received in manufacture. The photomicrograph (Pl. CV, Fig. 7) shows ferrite grains with very little slag, and evidence of cored structure. A few cavities are apparent.

Gold Leaf.[1]

Average thickness ·0005ins.

Baqaria 9	Gold ..	845·4	parts per thousand.
,,	,, ..	811·5	,, ,, ,,
Baqaria 7	Gold ..	812·7	,, ,, ,,
,,	Silver ..	51·2	,, ,, ,,
,,	Base Metals	136·1	,, ,, ,,
Outside Bucheum 11	Gold ..	905·6	,, ,, ,,
possibly	Silver ..	8·6	,, ,, ,,
from stela	Base Metals	85·6	,, ,, ,,

This is the purest gold which was assayed.

Bucheum B.

Gold ..	809·8	parts per thousand	
Silver ..	19·3	,, ,,	,,
Base Metals	170·9	,, ,,	,,

W. F. B.

Report on Bronze Vessels

By C. O. Bannister and R. Rigby.

The bronze vessels found at the Bucheum were received through Sir Henry Lyons of the Science Museum, South Kensington, for examination, and consisted of three circular open-topped pans or dishes marked 1931–831, and two semi-globular containers with hollow spouts or tubes marked 1931–830. These are shown on Pl. LXXXVII, Fig. 3 and Pl. LXXXVI, Figs. 1 and 2, at about two-fifths full size. For identification the pans are marked respectively A, B and F, and the containers are marked C and E, the one marked E has a hollow tube or spout firmly attached and that marked C has a circular hole to which was originally attached the separate hollow tube marked D, as shown in the photograph.

Bronze Dish A.—The pan marked A, Pl. LXXXVII, Fig. 3, is a circular vessel 2·56 inches deep, 8·5 inches in diameter, with a metal thickness of 0·05 inch. The specimen is badly corroded, shows loss of metal, some cracks, and the metal is extremely brittle in places, due to corrosion.

The metal is a bronze of the following composition :

Copper ..	88·86	Iron ..	0 ·005
Tin	10·08	Lead ..	Trace
Bismuth ..	0·008	Arsenic ..	Trace
Zinc ..	0·01		

[1] The proportion of gold is as high as the average standard in the tables given by Mr. Lucas in *J.E.A.*, XIV, pp. 313–319. *O.H.M.*

The microstructure of the metal shows that it has been cold-worked and annealed, the vessel itself having been raised from a cast blank. No trace of the coring of the original casting could be found, which indicates that the annealing during and after shaping had been thorough. The structure was crystalline, with twinning of certain crystals and Neumann bands resulting from the cold work. Corrosion product was found to have penetrated along the crystal boundaries throughout the metal, and appears also to have penetrated along the slip planes of certain crystals. This penetration of the corrosion product is illustrated in the unetched metal by Figs. 1 and 2 on Pl. CVI at a magnification of 130 diameters. Etching showed the absence of any of the original cast structure of the bronze.

The penetration of the corrosion product along the crystal boundaries is an effect only observed in antique bronze. (See *Examination of Bronze Implements*, by C. O. Bannister and J. A. Newcombe, *Nature*, Vol. 116, pp. 786–789, 1925.)

Bronze Dish B.—The vessel marked B is very similar in shape to vessel A, and has a diameter of 9·5ins., a depth of 3·62 ins., and a thickness of 0·05in. This vessel is somewhat less corroded away than A. The metal consists of bronze, but has a lower tin content than A, as shown by the following analysis :

Copper	92·84
Tin	7·13

The impurities consist of bismuth, zinc, iron, lead and arsenic, and are present in similar quantities to those reported in specimen A.

The microstructure of the metal of this vessel shows a uniform crystalline solid solution, with no trace of the coring of the original casting, indicating that it has been hammered into shape from a cast blank, annealing operations being used. Penetration of corrosion product has taken place throughout the mass, but this is not so marked as in specimen A ; penetration along the slip planes has also occurred in some areas.

Bronze Dish F.—The vessel marked F is similar in shape to both A and B, and has undoubtedly been produced in a similar manner by cold working a cast blank. It is 14ins. in diameter, 2·62ins. deep, with metal a little over 0·05in. thick, and somewhat more even in thickness, and hence heavier than the previous two specimens. The amount of corrosion is also less than in the previous specimens. The analysis of the metal is as follows:

Copper	95·51
Tin	4·47

The amounts of impurities are similar to those reported in vessel A.

Vaginal Douche.—The vessel or container C (Pl. LXXXVI, Fig. 2), is semi-globular in shape, having a diameter of 9ins. at the open end, with a height of 6ins. and a thickness of metal of 0·05in. It is in an apparently fairly good state of preservation, with the exception of a few places where it has corroded through, but it is heavily coated with dense corrosion products, the actual metal itself being very thin. The analysis of the metal is as follows :

Copper	95·04
Tin	4·94

The nature and amounts of impurities present being similar to those reported on the three previous specimens.

The microstructure of this specimen shows the annealed structure of worked bronze and corrosion products are found throughout the crystal boundaries. The vessel has undoubtedly

been produced by raising by cold work from a cast blank with frequent operations of annealing to remove the hardening and brittleness induced by the cold work. At the open end the sides of the vessel have been worked into a flange about 0·4in. wide and 0·75in. above this flange has been worked completely around the vessel a circular ridge, 0·25in. wide and about 0·1in. above the general level of the outside of the vessel.

Near the top of the dome on one side has been cut an almost circular hole 1·1in. in diameter, and from appearances on the inside, an attempt had been made to fix in the tube, specimen D, next described.

Spout of Douche.—The specimen D is a slightly-curved bronze pipe, 8·75ins. long, having a diameter of 1in. at the wide end and 0·63in. at the narrow end, with a flange beaten out at the wide end 1·5ins. in diameter at the outside. The metal is about 0·05in. thick and had been thoroughly cleaned up before receipt. Corrosion has not eaten through in any place. This pipe was undoubtedly made by hammering a flat piece of bronze into its present shape, periodical annealings being used during the process. This pipe and flange exactly fit the circular hole described as being present in vessel C, and it is certain that it once constituted a part of that vessel. There is no evidence of any joining method having been used to attach this pipe, nor is there any indication of any method having been used to seal up the joint along the pipe where the two sides of the original flat piece of bronze meet.

The analysis of this metal is as follows :

Copper	95·97
Tin	4·00

Impurities present in traces as reported in previous specimens.

Enema.—The specimen E (Pl. LXXXVI, Fig. 1) consists of a vessel similar to C, with exit tube attached, and is an extremely interesting piece of work. The main vessel is semi-globular in shape, being 7ins. in external diameter at the open end, with a height of 5·5ins. to the top of the dome and a thickness of metal varying from 0·25in. at the cast-on flange and rib to 0·06in. at the other parts. The analysis of this metal is quite different from the others examined and is found to vary somewhat in different parts as shown by the following figures :

Copper	from 65 to 71	Bismuth ..	0·005
Tin	,, 4 to 5	Arsenic ..	Trace
Lead	,, 25 to 30	Silver ..	Trace
Iron	,, 0·05		

It is seen from this analysis that the metal consists of a very leady bronze, and the uneven distribution of the lead throughout the metal causes the discrepancies shown in the analysis.

This vessel has suffered from corrosion far more than any of the others examined. The main interest in this vessel lies in the fact that it has been produced by a casting process and not by working from a cast blank, as was the case in the other vessels examined.

The microscopical examination of the metal confirms the presence of much lead and also the fact that no beating out of the metal had taken place in the shaping of the vessel and this is illustrated in Fig. 3, taken at a magnification of 130 diameters, showing the distribution of the lead (black portions) throughout the metal.

It is known to have become a general practice with the early Egyptians to make an addition of lead to the bronze used for casting ornamental and devotional objects, but on the other hand, lead has not been reported in Egyptian implements, except as an accidental impurity in trifling

amounts. Whether the lead was added to economize copper and tin is not known, but the early Egyptians seem to have realized that a proportion of lead (in some cases it has reached 33 per cent) simplified casting. (See *Ancient Egyptian Metallurgy*, by Garland and Bannister, C. Griffin & Co., 1927.) This method, however, could not have been used in this case.

The vessel gives information about the casting, however, for when cast it was anything but perfect, having some 10 holes or similar imperfections varying from 0·35 to 1in. diameter, which were afterwards made good by casting-on metal of similar composition, and smoothing off the outside. The repaired patches are best seen from the inside. This method of repair has not been found in pre-Roman times, the ancient Egyptians used a simpler but less efficient method for repairing vessels, etc., by the insertion of a solid piece of bronze into the hole and hammering over the two ends.

Microscopical examination confirms the former method of repair, and in Fig. 4 is shown, at a magnification of 130 diameters, a portion of the original vessel and a portion of the repair. By the presence of about the same proportion of lead it is clear that the repair was carried out with the same quality bronze, but the fact that the repaired portion would solidify more rapidly than the original casting would cause the lead particles to be smaller and this is seen to be the case in Fig. 4 at a magnification of 50 diameters, the left side being the structure of the original casting, the right side representing the metal of the repair.

It is interesting to note that in this vessel the cast-on flanges seen in E are very similar to the worked flanges in C.

The tube attached to this vessel is similar in composition to the tube D, and to the other vessels reported on earlier in this report. The metal contains :

Copper	95·8
Tin	4·1

with traces of tin, zinc, iron, bismuth and lead. It is 12·75ins. long and 1·25ins. in diameter. The tube has undoubtedly been made by hammering out bronze into a sheet and beating to its present shape, annealings being carried out at intervals. At three places on the line of contact, where the two sides of the plate join to make the pipe, at the two ends and near the middle, joining has been carried out by running on molten bronze to seal the joint, the excess metal being ground off flush with the surface of the tube. This has produced a very creditable finished joint.

The place of contact of the tube and the body of the vessel also gives an excellent example of joining by running on molten bronze. In making this joint, a mould was evidently made between the two parts after placing these into position, and molten bronze, containing much less lead than the bronze used for the vessel, was run in. A section of the weld at a magnification of 130 diameters is shown in the unetched state in Fig. 5, in which the lower portion shows the leady bronze body of the vessel and the upper portion shows the run-in bronze. Fig. 6 shows the same section after etching, the cast bronze structure being visible both in the run-on portion and in the original metal of the vessel. This operation was unknown in pre-Roman times.

Retractors.—Pl. LXXXVIII, Fig. 3.

These are trowel-shaped instruments or tools with rectangular, slightly-curved, working faces 6¼ and 6½ins. long by 1⅜ins. broad. The end is tapered and turned at a double

right angle to form a handle. The material is worked and annealed bronze, of the following analyses :

	A.	B.
Copper	92·10	95·32
Tin	6·63	3·34
Lead	0·87	1·07
Iron	0·04	0·03
Arsenic	Trace	Trace
Bismuth	0·006	0·005
Silver	Trace	Trace
Nickel	Trace	Trace
Zinc	Trace	Trace

Clamps.—Cf. Pl. LXXXVIII, Fig. 5.1. Baqaria 3, C and D.

These specimens consist of bronze which has been worked into shape by hammering followed by one or more annealings. Corrosion has taken place and penetrated the specimens practically to the centre, making them very brittle. Pl. CVII, A, Fig. 5 shows the microstructure at a magnification of 97½ diameters, and the following are the analyses :

	C.	D.
Copper	78·23	71·14
Tin	6·13	6·06
Lead	2·36	3·10
Arsenic	Trace	Trace
Bismuth	Trace	Trace
Iron	Trace	Trace
Silver	Trace	Trace
Zinc	—	Trace

C. O. B. and R. R.

Plates: Photograph		Plates: Drawing		Provenance	Object	Size Centimetres		Notes	Analysis	Description
Plate.	Fig.	Pl.	Fig.			*Ht.*	*W.*			
LXXXIV LXXXV	4 1-4	CLXI	1 & 2	Bucheum dump	Large situla	47·4	16·2	See also Vol. II, p. 22	p. 105	Cleveland
LXXXIV	3	,,	3	Under O F	Small situla	11·6	3·8		p. ,,	Louvre
LXXXVI	3	,,	6	Bucheum dump	*Kbh.*	28·4	10·0		p. 108	Copenhagen, N.G.
LXXXVII	1-2	,,	5	,, ,,	Cup	14·6	11·6		p. 106	Toronto
,,	4 (3)	–		,, ,,	Dish	1·2	12·4		p. 107	W.H.M.M.
,,	4 (2)	–		,, ,,	,,	1·2	12·4		p. ,,	,,
,,	4 (1)	–		,, 1–5	,,	·9	11·7	(Similar dish, Ar.x., at Manch'ter)	p. ,,	,,
LXXXVIII	3	CLXI	7	,, dump	Flute	1·4	33·5		p. ,,	Toronto
,,	4	–		,, ,,	Shovel	24·5	14·5		p. 106	,,
,,	2	CLXI	4	,, ,,	Bottle	4·6	2·2			Cairo
LXXXVII	3 (A)	–		,, X.N. end	Dish	6·5	21·6		p. 109	
,,	3 (B)	–		,, ,, ,,	,,	9·2	24·1		p. 110	
,,	3 (F)	–		,, ,, ,,	,,	6·7	35·6		p. ,,	
LXXXVI	1 (E)	–		,, ,, ,,	Enema	13·9	37·8		p. 111	Royal Veterinary College Museum, N.W.1. Temporarily held at the Science Museum till the new building for the former is ready
,,	2 (C.D.)	–		,, ,, ,,	Vaginal (?) Douche	15·2	35·0		p. 110	
LXXXVIII	3	–		,, ,, ,,	Vaginal (?) Retractor	3·5	18·3		p. 112	
,,	3	–		,, ,, ,,	Ditto	3·5	18·3		p. ,,	
,,	5	CLXII–CLXV		Various burials	Clamps	Various		See also p. 59, on the mummy.	pp. 106 & 113	Cairo, Toronto, and W.H.M.M.
,,	2	,,	B.20	Bucheum X	Miniature Clamps	3	4		p. 106	W.H.M.M.
,,	2	,,	B.19	,, ,,	,, ,,	3·3	3·3			,,
,,	1	–		Under floor of superstructures	Figure of Osiris	15·5		The stone figure on the left is for comparison (Found 1928/29)		B.M. 59452
,,	,,	–		Do.	,, ,, ,,	16		(Found 1928/29)		B.M.
LXXXIV	1	–		Baq. R.	Head of Ram	3	2·3	Spike at back for insertion		Manchester 9147
	,,	–		,, X	Iron Ring	1·3	4·0	Lotus pattern " Bezel " (2)		,, 9120, 9133
	,,	–		,, R.	Cone	3·2	4·2	Cap for vessel		,, 9143
	,,	–		,, R.	Needle	11·4	·4	Eye open at side.		,, 9140
	,,	–		,, R.B.G.	Silver Ring	2·9	Diam.	Baby's bangle		,, 9149
	,,	–		,, R.	Scale	5·6	4·0	Purpose unknown		,, 9141
	,,	–		,, RF–R.B.C	Bull or cow	3·5	6·3	Uncleaned in Fig. 2		Toronto
	,,	–		,, R.	Min. Axehead	4·4	3·5			Manchester 9137
	,,	–		,, R.	Arm of statuette	4	1			,, 9145
	,,	–		,, R.	Lid of lamp	2·1	1·3			,, 9146
	,,	–		,, R.	Foot of box ?	2·7	2·8			,, 9144
	,,	–		,, R.A.M	Bull	3·5	4·0	(Uncleaned in Fig. 2)		W.H.M.M.
	,,	–		,, R.	Leaf	4·7	3·7	Oak-leaf ?		Manchester 9142
,,	2	–		,, T.Q.	Bull	5	5	(Uncleaned)		Cairo
LXXXIX	1	–		,, 1. (Tomb)	Iron chisel	25?	4		p. 108	Toronto
,,	1	–		,, 1. ,,	Iron wedge	14?	4?			Bolton
,,	1	–		,, R.	Iron? tweezers	6	1·5			,,
,,	1	–		,, R.	Ring	Diam. 3·2			p. 108	,,
,,	2	–		Bucheum 13	Armour? scale	6·2	2·7	(Found 1928/29 (also found in cem. 200. Analysis)	p. 106	B.M. 59461
,,	,,			,, 13	Pin	8·2	1·4	,, belonging to above		B.M. 59462
,,	3	Drawing		Baqaria 5	Lamp	7·8	2·5	Drawing partly reconstructed		Buried
	–	–		Bucheum 20	Dish	Diam. 13·5		(Found 1928/29) May not belong to 20 : Contained charcoal		?
	–	–		,, 11	Gold wire	?	?	(Found 1928/29)		?
	–	–		,, 11&B.	Gold leaf	Thick. ·0013			p. 109	Science Museum
	–	–		,,A,C,E,F, H.M.&16 Baqaria 7, 8, 9, 10, 19	,, ,,				p. 109	,, ,,

Some unfigured small objects and fragments from the Baqaria Roman Village are in the Manchester Museum, Nos. :—9116, 9119, 9121, 9124-7, 9129-9132, 9134, 9136, 9148.

SECTION II, COINS.

The Register.—Each coin has been given a number to simplify reference, especially to the photographs on Pls. XC, XCI. The coins are grouped primarily according to provenance, and each group is arranged chronologically by Emperors, or, where the obverse is illegible, by reverse types. All the latter are added at the end of the list of emperors and not inserted in their chronological position. Numbers 300–309 in the addenda should have been placed earlier in the list, together with the other coins from the Bucheum and Baqaria, but they were discovered subsequently to the drawing-up of the list and, as they had no special associations, it did not seem necessary to re-arrange the list. The coins of each reign are arranged in the order of the catalogue to which they are referred. Differing mint marks of the same coin are arranged alphabetically. In the penultimate column a tick means that the coins appear on the photographic plates, in the last column that it has been analysed.

In the columns devoted to the obverse and the reverse no attempt is made to describe the coins, but only to illustrate points not differentiated in the catalogues. Broken legends are given throughout. No comment on this point means that the legend is unbroken. The draping of the bust is described in the billon series only. R.D. stands for *rosette diadem* ; S.D. for *stone diadem* ; no comment on this point means *pearl diadem*, except in the case of *wreath* or *radiate*, which are always mentioned in the catalogues. Where uncertainty exists, owing to the state of the coin this is made clear by a note, *worn*, or *clipped* as the case may be.

For ungrudging assistance in the identification of these coins, and the preparation of the register, I am deeply indebted to Mr. J. W. E. Pearce and to the staff of the Department of Coins and Medals, at the British Museum.

Dating Evidence.—The coins from the Baqaria Roman Village are the most useful evidence we have. The period is too short and the coins too few to make a satisfactory graph. Various methods of doing so were tried but they yielded such a variety of results that the attempt was abandoned. The range of the coins is clearly shown in the table given below. The bottom part of the list enumerates the coins which could be identified only by their reverse types.

CHRONOLOGICAL TABLE OF COINS FROM BAQARIA ROMAN VILLAGE

Emperors	*Date*	*Quantity.*
Ptolemaic	200–100 B.C.	2
Tiberius ?	A.D. 14–37	1
Claudius I	41–54	1
Vespasian	69–79	1
Antoninus Pius	138–161	1
Aurelianus and Vaballathus	270–271	1
Probus	276–282	1
Carinus	282–285	2
Numerianus	283–284	1
Diocletianus	284–305	11
Maximianus I	285–305	6
Helena	d. 328	1
Galerius Maximanus (Cæs.)	292–305	(Hoard of 22)
Severus	305–307	1
Maximinus II	305–313	–
Licinius I	308–324	3
Licinius II	317–324	5
Constantinus I	306–337	13
Crispus	317–326	2
Constantinus II (Cæs.)	317–337	2

Continued.

CHRONOLOGICAL TABLE OF COINS FROM BAQARIA ROMAN VILLAGE—*continued.*

Emperors	*Date*	*Quantity.*
Constans (Aug.)	337–350	6
Constantius II (Aug.)	337–361	18
Constantius Gallus	351–354	1
Julianus II	355–363	5
Jovianus	363–364	2
Valentinianus I	364–375	1
Valens	364–378	1
Valentinianus II	375–392	2
Theodosius I	379–395	2
Arcadius I	383–408	2
Types	*Circa*	
Urbs Roma	330–337	1
Constantinopolis	330–337	2
Gloria Exercitus (Two Standards)	330–337	1
Gloria Exercitus (One Standard)	335–340	2
Victoriæ DD. Augg. Q. NN	340–348	5
Fel. Temp. Reparatio, Warrior spearing fallen horseman. (Large)	348–354	3
Fel. Temp. Reparatio, Warrior spearing fallen horseman. (Small)	348–360	15
Vot. XX Mult. XXX (House of Constantine)	339–360	3
Spes Reipublice	348–360	7
Securitas Reipublicæ	365–376	16
Gloria Romanorum, Emperor drags captive	365–385	3
Salus Reipublicæ, Victory drags captive	388–395	4
Late Fourth Century, types not identified	340–395	42
Egypt under the Mamlukes	1362	1
Egypt under Turkey	1600–1700	2
Unidentified	?	4

The three Arabic coins were dropped most probably at the times when the remains of the village were quarried for red brick. The two Ptolemaic coins and the five early Roman coins may be presumed to have been dropped by those going to and from Baqaria, though the small house just inside the temenos may have been inhabited in the early Roman period. The terminal dating is clear enough. In a site series, if the Æ 4 coins of Theodosius and Arcadius are found at all, they are usually found in quantities far in excess of any others ; the presence of only two of these and of only six other coins subsequent to 376 shows conclusively that the village was declining in importance during the last quarter of the century and was probably deserted by 400. The evidence as to its inception is not so conclusive ; there can have been little if any activity between 270 and 284, as only one coin of each emperor during that period was found and it is not unlikely that these four coins were specimens that were current in the time of Diocletian. The hoard of 22 coins, though mainly of Diocletian and Maximianus, contained one of Galerius Cæsar and was therefore not buried prior to 292.

The absence of coins of Maximin II is curious, but his coins were all of the larger module, which occurred infrequently on this site. The most likely time for the founding of the village appears to be during the reign of Diocletian, though a date as early as Aurelian or as late as the beginning of the reign of Constantine the Great cannot be entirely eliminated.

The Bucheum and Baqaria coins do not provide any very valuable evidence. They seem to show that there was a robbery of the site in the time of Constantine II and another in the reign of Justinian. The coins of the former might possibly belong to devotees, though it is difficult to imagine why early burials should be legitimately open at this date, unless for repairs —an unlikely supposition considering the period.

The coins from the Arab Village (200) are an interesting indication of the poverty of the

period, for people were taking the trouble to bury as little as six piastres at a time. Perhaps this was tax evasion.

The only specimens of numismatic interest are the barbarous examples Nos. 81, 306, and 324, the last-named being one of the loose coins brought in by children from a provenance unknown, but certainly not far from Armant. These three coins are at the British Museum. The rest are at the Chelmsford and Essex Museum.

On Pl. CIX, Figs. 2 and 3, are shown two Nome coins of Hadrian which illustrate Buchis. These are twice natural size. The numbers of these coins are 99 and 100 in the Nome Section of the *British Museum Catalogue of Greek Coins from the Alexandrian Mint*.

The Analyses.—Reference to the register shows that the coins, analyses of which are given by Mr. Brazener on pp. 119–120, were all selected from those of the Alexandrian mint. This was done in order to discover what changes in the alloys used took place during the period represented. The spacing of the coins is not evenly progressive in time, but the deficiencies can be filled in at a later date.

Billon.—Only two billon coins were analysed, No. 26 (Aurelian and Vaballathus, A.D. 270) and No. 34 (Diocletian, A.D. 291). No. 26 shows over 9 per cent silver and nearly 1 per cent antimony. The latter metal is probably an impurity though it was present in no other coin among this series. In *Die Bronzen und Kupferlegierungen der alten und ältesten Völker* (Erlangen, 1869), p. 57, No. 93, Herr Bibra has analysed a coin of Constantinus Magnus with ·97 per cent of antimony. He marks it with a double mark of exclamation and the antimony is greatly in excess of the quantity found in any other specimens of the Imperial series analysed by him. He finds ·98 per cent—2·2 per cent silver in coins of Aurelian (Nos. 79–82 *ibid.*), and ·25 per cent and 1 per cent in coins of Diocletian (Nos. 85 and 86 *ibid.*). *The British Museum Catalogue of Greek Coins from Alexandria*, p. xxix, quoting from *Mon. Rom.*, iii, 333, n.3, states that the billon coins at the time of Claudius II (A.D. 268–270) contain only ·38 per cent of silver and those of Diocletian ·18 per cent. Dr. J. G. Milne, in *Catalogue of Alexandrian Coins in the Ashmolean Museum*, p. xliii, says : " there is only about 2 per cent of silver in the tetradrachms of Claudius II and 1 per cent in those of Diocletian." Walter Giesecke, *Das Ptolemäergeld* (Leipzig, 1930), p. 86, discussing the Alexandrian billon says : " . . . *des Elegabal bis Trajaum* (sic) *Decius* 0.937 g. *oder ungefähr 7 v. H., bis sie schliesslich nur noch Spuren von Silber enthielten*." There is, therefore, an unexpectedly high silver content in No. 26, but the absence of any silver in No. 34 is not surprising, especially as this coin was minted only a few years before the reform of the coinage.

The Bronze.—The largest number of analyses for comparison with the present series is that given by Herr Bibra (*op. cit.*) and recapitulated and re-arranged with a number of additions by J. Hammer in *Zeitschrift für Numismatik*, Vol. XXVI, pp. 1–144, There can be no doubt as to the thoroughness of the analytical work, which was mostly Bibra's own, but unfortunately the size and type of the coins can only be guessed from the weights, no details being given, and worse still, there is considerable doubt about the mint in a majority of cases, especially in the Imperial series. Nevertheless a number of relevant facts and interesting comparisons emerge.

Hammer, *op. cit.* p. 118 (following Bibra, p. 82, Nos. 1–22), says that it is recognized that in coins of the early Greek states the tin alone is added and that traces of lead (·22 per cent), zinc, silver, etc., are only impurities. On p. 121, in a table of Ptolemaic bronze (extracted from Bibra p. 84, Nos. 56 and 57 ; p. 94, Nos. 20–22), he shows that the range of percentages of metals

is as follows: copper, 84·25–90·75; tin, 5·72–15·65; and lead, 0–8·62. The percentage of lead in Mr. Brazener's analysis of No. 116 is nearly three times the maximum figure from this table. The iron content in this coin is also very high, nearly nine times as great as the average figure in the other coins from Armant, but it would be dangerous to postulate an intentional alloy. A general comparison with Bibra's series shows that the lead content is more consistently high in the present analyses and the zinc content lower. Bibra finds zinc rising to 4·4 per cent in a coin of Constantius II and in some other specimens to 17 per cent. The only coin analysed by Mr. Brazener which shows evidence of being brass is No. 210, a modern coin, with 3 per cent zinc. The percentage of tin is also generally higher in Bibra's analyses than in those given here. Because Bibra's coins are from various mints and of various years and denominations they do not provide so valuable a guide and comparison as would otherwise have been the case.

Miss C. F. Elam, in paper No. 550 of the Institute of Metals (read March 11 or 12, 1931) gave an account of the examination of fifteen Greek silver coins of 500–300 B.C., and paid particular attention to the different mints. In her summary she said: "The treatment they received was very varied in the different mints, although the coins from the same mint resemble one another." The author also dealt extensively with the microscopic examination of the coins as Mr. Brazener has done, and her conclusions on the preparation of the metal are very similar to those given here.

The only photomicrograph of a bronze coin which we were able to trace was that of a bronze of Constantine, published by H. Garland in the *Journal of the Institute of Metals*, 1913, 10, 329–341.

A fact which clearly emerges from a study of the analyses is that the "bronze" coins are of four different kinds, copper, bronze, brass, and an alloy of copper containing much lead (taking no account of accidental impurities). At the present moment, these coins in the mass are referred to as bronze, brass (almost an archaism now) or copper, according to the fancy of the writer. Prof. T. A. Rickard, *Journal of the Royal Anthropological Institute*, LXII, pp. 281–290, wrote challenging archæologists for their loose terminology in reference to objects of copper alloy. The impeachment is true, but hardly fair. No one can be expected to describe each coin or object as "A copper-or-copper-alloy lamp," etc., yet, until analysis is made, which in many cases may be altogether undesirable, this is the archæologist's or numismatist's only refuge from inaccuracy. What is urgently required is a generic term for all alloys containing a high percentage of copper, the term to be inclusive of copper itself—some such word as "Cupral." If the Institute of Metals would settle upon a term and circularise archæologists and numismatists, all further trouble could be avoided.

One further point. There can be no doubt that a systematic series of analyses of a large number of coins from one or more mints, combined with analyses of the ores from different mines within the Roman Empire, would produce most interesting results. By this method it should be possible to determine at what point the percentages of tin, zinc, iron, etc., may be regarded as intentional, and also, when they prove to be impurities, to decide whence the ore for the mint was drawn. There are a number of other directions in which our knowledge would be extended if the work covered a wide enough area. Until such work has been done it is impossible to draw any very definite conclusions from the results of chemical analyses published here, but the series should prove a starting point for work on the Alexandrian mint.

ANALYSES

By W. F. Brazener

The table below shows the commoner elements which have been discovered in routine analysis. The figures do not total 100 per cent, and this is mainly due to certain products of corrosion, which were adhering to the surfaces of the coins, despite the acid cleaning to which they had been submitted. Of course, there may be traces of other elements which it has not been possible to determine owing to the small amount of sample provided by the coins.

Metallurgically, they are of great interest, in that, although the composition of many is such that the alloy could not be either hot or cold worked in the modern sense of these terms, yet the structure indicates that the metal has been beaten down from some thicker stage into comparatively thin sheets. The process must have been laborious, and have required great patience. The slightest amount of overwork would, undoubtedly, have caused fracture, and a considerable number of annealings must have been interposed during the process.

The microscopic examination reveals very clearly the amount of deformation which these alloys have been able to withstand, and a study of the photomicrographs on Pl. CV gives an indication of the general structure of the coins. In all the alloys containing a large percentage of lead, the crystal structure is masked, as this element is present as a separate constituent of the alloy.

Sample No.	*Date*	*Copper %*	*Tin %*	*Lead %*	*Iron %*	*Nickel %*	*Zinc %*	*Silver %*	*Antimony %*	*Micro-Examination*
116	(200–100 B.C.)	68·15	3·62	25·09	1·89	Nil	·08	Nil	—	All structure obliterated by large quantity of lead.
23	(A.D. 41–54)	83·70	4·63	10·65	·16	—	·24	—	—	Small alpha crystals. Signs of cold working (twinning). Traces of coring still visible. Some delta present.
24	(A.D. 69–79)	72·40	6·68	20·10	·28	—	·24	—	—	See Pl. CV, Fig. 1. The large quantity of lead entirely masks the crystal structure. This specimen would have to be worked with very great care to avoid cracking.
25	(A.D. 138–161)	83·38	2·66	13·15	·10	—	·16	—	—	Alpha structure, very small grains, signs of coring.
44	(A.D. 285–305)	96·95	·87	1·09	·20	—	·24	—	—	Small alpha crystals in annealed condition. No coring visible.
69	(A.D. 306–337)	91·39	3·78	2·81	·13	·10	·06	1·01	—	Alpha structure, small grains, signs of cold work. Corrosion penetrated into sample via crystal boundaries.
57	(A.D. 317–323)	97·30	·11	·34	1·54	Nil	·14	Nil	—	Small alpha grains, fairly heavily cold worked, showing twinning. Coring still visible.
86	(A.D. 337–361)	77·18	1·57	19·91	·07	—	·08	·36	—	Alpha crystals in cold worked condition. Coring plainly visible. Large quantity of lead. Corrosion has penetrated deeply into sample.
101	(A.D. 355–363)	83·68	1·24	13·98	·20	—	·50	Nil	—	Small alpha crystals, worked and annealed.
105	(A.D. 363–364)	83·92	1·10	13·64	·07	·10	·06	·35	—	Alpha structure showing cold work and coring. Large quantity of lead tends to hide structure.

Sample No.	*Date*	*Copper %*	*Tin %*	*Lead %*	*Iron %*	*Nickel %*	*Zinc %*	*Silver %*	*Antimony %*	*Micro-Examination*
162	(A.D. 366–376)	86·71	·78	11·98	·10	·11	·05	·26	—	See Pl. CV, Fig. 2. Large quantity of lead obscures the structure. The general appearance is of alpha grains embedded in lead. There is also some evidence of coring, which is to be expected from the composition and the way in which it would be necessary to work the alloy.
111	(A.D. 379–395)	98·16	·20	·41	·17	Nil	·16	Nil	—	See Pl. CV, Fig. 3. This has an alpha structure with evidence of coring and indicates that the specimen has been cold worked and annealed, although it has not received a final annealing. Although, from the composition, a pure Alpha structure could have been produced, it would appear that this coin was made by only slight deformation with intermediate annealings. This is borne out by the indistinct nature of the alpha structure, together with the coring shown.
274	(A.D. 1362)	98·08	·79	·20	·07	Nil	·08	—	—	See Pl. CV, Fig. 4. Small alpha crystals, showing slight deformation due to cold work, with some "twinning." No coring is visible. This alloy would be subjected to considerable cold work between annealings.
276	(A.D. 1600–1700)	98·94	Nil	·36	·10	·09	·09	—	—	See Pl. CV, Fig. 5. Alpha structure slightly under-annealed. Dark patches indicate the presence of lead. Actually, out of the samples assayed, this is the nearest to pure copper. This sample could be heavily cold worked without requiring annealing.
290	(A.D. 1860)	92·64	3·26	·12	·15	Nil	3·00	—	—	See Pl. CV, Fig. 6. Fully-annealed alpha structure, indicating traces of lead. This alloy has received considerable deformation between annealings, and has received a final annealing which has given a structure comparable with anything which could be desired even under modern conditions.
26	(A.D. 270)	86·81	1·48	1·00	·21	·04	·12	9·33	·92	Alpha structure, containing some hard white constituent, evidently due to silver or antimony or both. No coring. Specimen badly corroded.
34	(A.D. 284–305)	71·18	4·95	22·84	·15	Nil	·11	Nil	Nil	Annealed alpha solution showing signs of coring. Delta present in small quantity.

CHAPTER XIII

AMULETS

By Alan W. Shorter.

The preparation for the tomb which the body of an ancient Egyptian underwent did not consist merely of the process of embalming. It is true that the preservation by artificial means of the physical body which the dead man or woman had inhabited during life was all-important, but the needs of the dead did not cease there. If the body were to remain intact for the visits of the disembodied spirit, and, even more important, be able to reconstitute itself as a truly living body, it was imperative that it should be protected by every means that magic could devise. Among the many pictures and objects of magical intent with which an Egyptian tomb was filled, the funerary amulets played an exceedingly important part, for they were actually placed upon the body itself during the process of bandaging, while an attendant priest recited the spells appropriate to each.

If, then, in ancient Egypt such supernatural aids were given to human beings on their departure into another world, it is not surprising to find that those animals which were believed to be the incarnations of gods enjoyed similar privileges, especially when they were deities of such importance as Buchis, the "living soul of Rē'." In fact, the higher orders of sacred creatures were treated, after death, in all respects as human beings, and their mummies provided with the same amulets that man himself required.[1] How magnificent these amulets could be was shown by the discoveries of Mariette in the Serapeum at Memphis, the burial place of the Apis bull, where they were fashioned of gold and semi-precious stones, and exquisitely inscribed with magical texts.[2] No objects so splendid have been found in the Bucheum, for the obvious reason that the robbers who thoroughly plundered it removed all things of intrinsic value, leaving behind only those for which they had no use, but nevertheless the series of amulets recovered form an interesting series (Pls. XCII–XCV).

Position of Amulets.

Of the amulets placed upon a human body each had its prescribed position, which related to its own special significance, and, since the amulets used for Buchis were the same amulets, it is natural to suppose that they occupied similar positions upon his mummy. Unfortunately this cannot be tested, as in no instance[3] were they found in their original places, but had been scattered about by the thieves in their search for articles of value.

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[1] See the reference to amulets in *The Apis Papyrus*, Spiegelberg, A.Z. 56, 19 and 26.

[2] Mariette, *Le Sérapeum de Memphis*, 1857 (see n. 3, p. 2), Pls. 9, 11 etc.

[3] With the possible exception of the amulet from Baq. 32.

We shall probably not be far wrong, however, if we assume that the same development which has been observed in the positions of amulets on human bodies followed in the case of Buchis also ; that is to say that, from the Eighteenth Dynasty (when funerary amulets as such first became common) to the Thirtieth Dynasty, the general scheme of arrangement remained more or less the same, and that with the advent of the Ptolemaic era the ritual positions were more and more disregarded, until finally the sacred objects came to be distributed at random over the body.

Kinds of Amulet.

All the most usual amulets are represented here, and it would be impossible in the space allowed to discuss the meaning and significance of all of them. It must suffice to summarise briefly the more important kinds. Further details may be found in the register at the end of this chapter.

Scarabs.—Representing the Sun-god in his form Khepri.

(*a*) *Heart-Scarab.*—Intended to stimulate the deceased's heart into action. Often inscribed with Chapter XXXB of the *Book of the Dead*, and ordered by a rubric of Chapter LXIV to be placed " in the breast " of the person.

(*b*) *Pectoral Scarab.*—With outspread wings. Often attached to the bead netting with which mummies were covered.

(*c*) *Small Scarabs.*—Placed inside the wrappings on various parts of the body. The type with legs carved underneath begins in the Thirtieth Dynasty, and the hawk-headed scarabs are of the Ptolemaic and Roman Periods.

The Uzat.

Represents equally well (*a*) the Eye of Rē', which, according to legend, strayed away from him and was restored by Thoth " in sound condition " (*uzat*), and (*b*) the Eye of Horus, torn out and mutilated by Set in the fight between them after the murder of Osiris. It was put together and rendered " sound " (*uzat*) once more by Thoth. The amulet was thus intended to enable the dead person's body to remain " in sound condition." See *Book of the Dead*, Chapter CLXVII.

Girdle of Isis.[1]

What this amulet represents is disputed. Most probably it is a girdle-tie. Believed to represent in some way the blood of Isis, and often made of red materials, such as carnelian. Intended to stimulate the dead man's blood. See *Book of the Dead*, Chapter CLVI.

The Ded.[1]

Whatever its original significance had been, by the time that it was employed as an amulet it was believed to represent part of the spinal column of Osiris. Intended to strengthen the dead person's backbone. See *Book of the Dead*, Chapter CLV.

The Papyrus Sceptre (*Uaz*).

Originally represented the papyrus sceptre held by goddesses. It was intended to render the deceased " fresh " or " flourishing " (*uaz*). See *Book of the Dead*, Chapters CLIX, CLX.

[1] For the latest discussion of these amulets see Schäfer, " Djed-pfeiler, Lebenszeichen, Osiris, Isis," in *Griffith Studies*, p. 424.

The Pillow, or Head-rest.

Originally intended to ensure sound sleep to the deceased, but later to prevent the loss of his head. See *Book of the Dead*, Chapter CLXVI.

The Two Feathers of Maat.

As part of the *atef*-crown of Osiris.

The Two Fingers.

On human mummies usually found on the left of the pelvis, near the embalming incision. Hence, perhaps, the amulet represents the two fingers of Anubis, the embalmer of Osiris (and so in theory of all dead people), which would be inserted through the wound at the beginning of the process of evisceration.

The Human Heart.

For the protection of the deceased's heart.

The Menat.

A heavy bead necklace, with counterpoise, worn by certain deities, especially Hathor, with whom it was closely connected, the goddess actually being worshipped in the form of a *menat* at Denderah. The amulet, which represents the counterpoise alone, was supposed to confer prosperity and physical enjoyment.

The M'ankhet.

Also the counterpoise of a collar, and depicted among other ornaments on Middle Kingdom coffins.

The Name-bead.

This term is convenient for classification, but by no means fully explains the amulet, which, although often inscribed with the name and titles of the deceased, sometimes bears also a short text : " May Isis give me light with her brightness." The amulet is in the form of a long bead (usually barrel-shaped), and, in the best periods, is made of carnelian. The unpierced barrel-beads found in M (Pl. XCIII, 1 C. 5–8), are probably degenerate forms of this amulet.

Deities.

These are as usual : Isis, Nephthys, Horus, Thoth, etc., and atriad showing Harpocrates between Isis and Nephthys.

Animals sacred to gods.

Hawk of Horus, vulture of Nekhebet (or Mūt), uraeus of Uto, frog of Hekt. Note especially the bull Buchis himself (or the sacred cow, his mother) on Pl. XCV, Fig. 7, and the foreparts of two bulls back to back (Pl. XCII, Fig. 2, B.2.)

Of special interest are

The horns and double plumes of Buchis (Pl. XCIV, Fig. 1).

Not known elsewhere. The upright piece in the centre conventionally represents the tall plumes.

The Obelisk (Pl. XCIV, Fig. 2).

An infrequent amulet, of uncertain significance.

Finally, one might draw attention to the cow (or bull) trussed for sacrifice, as an example of the unthinking manner in which the Egyptians extended the use of funerary amulets from the human to the animal dead. Originally the amulet was intended to ensure the dead person

plenty of beef in the next world, of which the vegetarian Buchis would certainly not stand in need, and to which, moreover, in his case allusion was scarcely tactful! We may compare the manifold inconsistencies which resulted, many centuries earlier, from the extension of mortuary equipment from the King to the common people, when royal diadems and insignia were represented in the pictures on Middle Kingdom coffins as part of the ordinary person's requirements.

Dating of Amulets.

In regard to this question the series recovered from the Bucheum does not contribute new information, owing to the difficulty of obtaining chronological evidence in all but a few cases. No group is earlier than the Thirtieth Dynasty. The following register is largely compiled from information supplied to me. The only specimens which I have personally examined in the preparation of this account are those preserved in the British Museum, the hieroglyph from Baqaria 32 and the fragment of statuette from Baqaria 33. References are to Petrie *Amulets*.

REGISTER OF AMULETS.

Individual objects in the figures number from left to right. The letters indicate the lines.

Burial	*Plate*	*Museum*	*Mus. No.*	*Description*	*Material*	*Remarks*
Bucheum (?) ...	XCIV 3 C.4	Brit. Mus.	59503	Papyrus sceptre: suspension ring not pierced	Dull green felspar	1928/29
Augustus ...	—	,,	59511	Scribe's tablet	Lapis	
				Plumes of Amūn	White glass paste	28/9. 322
B (Cleopatra) ...	XCII 1 A.1	Cairo	54281	Two fingers: rt. hand	Grey stone	
	2	,,	54282	*Uzat*	Red porphyry	
	3	,,	54283	Scarab	,, ,,	
	4	,,	54284	*Uzat*	,, ,,	
	5	,,	54285	*Shen*-symbol (?)	Lapis	
	B.1	,,	54286	*Uzat*	Felspar	
	2	,,	54287	*Ded*: fragment	Lapis (?)	
	3	,,	54288	Hawk: legs missing	Black and white stone	
	4	,,	54289	*Ded*: fragment	Lapis (?)	
	5	,,	54290	Circular piece of inlay	Red jasper	
	C.1	,,	54291	Red crown: for inlay (?)	,, ,,	
	2	,,	54292	Hieroglyph: for inlay	,, ,,	
	3	,,	54293	*Nemes*-head-dress	Grey stone	
	4	,,	54294	Hieroglyph: for inlay	,, ,,	
	D.1	,,	54295	Circular object	Black and white speckled stone (granite ?)	
	2	,,	54296	Barrel bead	Red and white quartz	
	3–5	,,	54297–9	Circular pieces of inlay	Red jasper	
	E.1	,,	54300	Fragment of inlay	Lapis (?)	
	2	,,	54301	*Uzat*	Grey stone	
	3	,,	54302	*M'ankhet*	,, ,,	
	4	,,	54303	*Uzat*	,, ,,	
	5	,,	54304	Hieroglyph: for inlay	,, ,,	
C (Tiberius) ...	XCIV 5	,,	54305–12	Very coarse amulets and fragments of inlay. Note the following:	Faience	Deeply corroded, colour not discernible
	5 A.1	,,	54305	Scarab	Faience	
	XCIV 5, B.2	,,	54310	Two fingers (?)	Faience	

REGISTER OF AMULETS—*continued.*

Burial	*Plate*	*Museum*	*Mus. No.*	*Description*	*Material*	*Remarks*
G (Darius III) ...	XCII 6 2 A.1	W.H.M.M.		Wing of pectoral scarab (fragment)	Green faience	
	2	,,		One of the sons of Horus	,, ,,	
	3	,,		Head of a statuette of Isis	,, ,,	
	(?) 4	,,		Girdle of Isis	,, ,,	
	5	,,		Scarab	,, ,,	View of belly
	B.1	,,		As A.1	,, ,,	
	2	,,		Double bull	,, ,,	
	3	,,		Uræus	,, ,,	
	C.3	,,		Body of pectoral scarab	,, ,,	
	4	,,		Unknown object	Leather	
	D.1	,,		*Uzat*	Green faience	
	E.1	,,		Triad of Isis, Harpocrates and Nephthys	,, ,,	
	2–3			Two unknown objects	Chert	*cf.* Petrie, XV, 123 (?)
L	XCIII 1 A.1,6	,,		Two papyrus sceptres	Green felspar	
	2, 5	,,		Thoth	Lapis	
	3	,,		Hawk-headed scarab	,,	
	4	,,		Pyramidal seal	,,	
M	XCIII 1 B	Toronto		Necklace of faience. In centre:		
				(1) spherical bead	Diorite	
				(2) barrel bead	Schist, coloured with epidote[1]	
				(3) barrel bead	Carnelian	
	C.1	,,		*Menat*	Limestone	
	2	,,		*Ded*	Lapis	
	3	,,		*Uzat*	Lapis	
	4	,,		Spherical bead	Diorite	
	5, 6, 7, 8	,,		Barrel beads, unpierced	Lapis (?)	
	9	,,		Horus wearing Double Crown	Lapis	
	10	,,		*Uzat*	Limestone	
N	XCIII 1 D.1	,,		Nephthys	Lapis	
	2	,,		Human heart	,,	Faded
	3	,,		*Ded*	Faience	
	E	,,		String of frit (?) beads with shell spheroid in centre	Frit	
8	XCIII 2 and 3	Brit. Mus.	59471	Heart scarab, or pectoral[2]: base pierced at each end	Schist	Length: 7 cms. Height: 3·5 cms.
14	XCIII 4	,,	59474	Fragment of pectoral scarab	Faience: once blue or green	Found by sarcophagus; length 2·5 cms.
15		,,	59513	*Shen*: for inlay	Red glass	Corroded: circle in centre drawn in dark colour
		,,	59488	*Uzat* (left eye): not pierced	Limestone	
	XCIII 5 A 2	,,	59501	Horns of Buchis, with plumes between not pierced	Glass: horns blue; plumes red	Corroded
	1	,,	59509	A son of Horus: head missing; not pierced	Glass: now white	,,
	3	,,	59510		Red glass	,,
	B 1	,,	59473	Body of large, flat scarab: broken; not pierced	Blue glass	Much corroded and burnt (?) from a rectangular pectoral (?) length 4·7 cms
16	XCIII 6 A 1	W.H.M.M.		Seated goddess	Lapis	
	2	,,		Seated Horus, Rē' (or Month), hawk-headed	Green felspar	

[1] A complex silicate. [2] Used in net.

REGISTER OF AMULETS—*continued.*

Burial	*Plate*	*Museum*	*Mus. No.*	*Description*	*Material*	*Remarks*
16	XCIII A 3	W.H.M.M.		*Menat* : fragment	Green felspar	
	4	,,		Papyrus-bud column : fragment	,, ,,	*cf.* palm column, Petrie 268
	5–6	,,		Two papyrus sceptres		
	B 1	,,		*Ankh*	Magnetite (?) altered to limonite on surface (?)	Magnetic and has a steely lustre when scratched
	2	W.H.M.M.		Human heart	Yellow granite	
	3	,,		,, ,, : fragment	Epidote (?)	
	4	,,		*Uzat*	Slate	
	5	,,		,, : fragment	Breccia	
	C.1	,,		Pyramidal seal (?)	Yellow granite	
	XCIII 2	,,		Rectangular writing tablet or plaque	Lapis	
	3	,,		Scarab	,,	
	4	,,		,, : fragment	Sandstone	
	5	,,		Pebble, pierced	Flint	
17	XCIII 1 A.1	Brit. Mus.	59479	Feathers and disk of *atef*-crown : not pierced	Limestone	
	2	Cairo	53136	Human heart	Green felspar	
	3	Brit. Mus.	59481	,, ,, : ring not pierced	Dark, greyish-green serpentine	
	4	,,	59482	,, ,,	Green felspar	
	5	,,	59478	Plumes of Amūn : not pierced	Limestone	
	B.1	,,	59486	*Ded* : not pierced	Carnelian	
	2	Cairo	53134	Girdle of Isis	Faience	
	3	Brit. Mus.	59483	Human heart : ring not pierced	Lapis	
	4	,,	59484	*Ded* : not pierced	Dark blue lapis	
	5	,,	59485	,, ,,	Light blue lapis	
	Bottom	,,	59500	Two fingers, rt.hand: not pierced	Black serpentine	
	XCIV 3 A.1			Pillow with two bulls' heads roughly carved	Hæmatite	28–9/312 : found outside burial
	B.1	Brit. Mus.	59512	Rectangular piece of inlay (?)	Lapis	
	C.1	,,	59502	Papyrus sceptre : ring pierced	Green felspar	Found outside burial
	2	Cairo	53132	Carpenter's square	Hæmatite	Found outside burial
	3	Brit. Mus.	59490	*Uzat* : ring not pierced	Dark, greenish-grey serpentine	
	5	Cairo	53130	Hawk-headed deity : seated	Green felspar	
	D.1	Brit. Mus.	59492	*Uzat* : ring not pierced	Dark grey obsidian (?)	
	2	,,	59494	,, ,, ,,	,, ,, ,,	
	3	,,	59498	,, ,, ,,	Limestone	
	4	,,	59493	,, ,, ,,	Dark grey obsidian (?)	
	5	,,	59491	,, ,, ,,	,, ,, ,,	
	XCIV 2 A.1	Cairo	53139	Obelisk	Lapis	
	2	Brit. Mus.	59475	Hawk-headed scarab : legs carved beneath: not pierced	Black basalt (?)	
	3	Cairo	53124	Scarab : legs carved beneath	Lapis	28–9/274
	4	,,	53127	Hawk-headed scarab	,,	
	B.1	Brit. Mus.	59505	Hawk : ring not pierced	,,	
	2			Scarab	Black paste	28–9/276
	3	Cairo	53135	Papyrus sceptre on plaque	Green felspar	
	C.1	,,	53138	Pyramidal seal	Porphyry	
	2	Brit. Mus.	59506	Standing vulture : not pierced	Faience: once glazed	
	3	Cairo	53128	Bull or cow trussed for slaughter	Greenish faience, now brown	

REGISTER OF AMULETS—*continued.*

Burial	*Plate*	*Museum*	*Mus. No.*	*Description*	*Material*	*Remarks*
17	XCIV 2 C.4	Cairo	53131	Standing vulture	Lapis	
		Brit. Mus.	59499	Scarab (fragment) : legs carved beneath	,,	
				Wing of pectoral scarab : fragment	Faience	28–9/271
18	XCIV 3 A.2	,,	59496	*Uzat* : ring not pierced	Diorite	
	3	,,	59480	Feathers of *atef*-crown : not pierced	Obsidian	
	4	,,	59504	Pillow : not pierced	Dark brown hæmatite	
	B.2	,,	59497	*Uzat* : ring not pierced	Light blue lapis	
	3	,,	59495	,, : pierced crossways	Brown colour, deteriorated, glass (?)	
18	XCIV 3 B.4	,,	59489	*Uzat* : pierced crossways	Marble (polished)	
	XCIV 4 A.1	Cairo	53137	*Ded*	Glazed limestone	
	2	Brit. Mus.	59476	Scarab : legs carved beneath: not pierced	Faded lapis (?)	
	3	Cairo	53125	Scarab	Diorite	
	4	Brit. Mus.	59487	*Ded* : very thin : not pierced	Light blue lapis	
	Bottom right.	,,	59507	Thoth : beak broken : not pierced	Lapis	
	left			Nephthys	,,	28–9/302
	B.2			Scarab	Green felspar	28–9/303
	1, 3			Spheroid beads, not pierced	Diorite	28–9/306
	Bottom, centre			Long barrel bead	Faience	28–9/307 : length 3·5cms.
	,, ,,			,, ,, ,,	,,	28–9/309 : length 2·1cms.
	,, ,,			Barrel bead	,,	28·9/308 : lgth. 1·7 cms.
	,, ,,			,, ,,	,,	28–9/310 : lgth. 1·05cms.
	XCIV 6	,,	59526	Rt. wing of pectoral scarab : blackened with fire : pierced with 4 holes	Faience : once green or blue	Length 9·2cms. Found outside burial with many beads
	XCV 1. 1	Cairo	53133	Pillow	Hæmatite	
	2	,,	53129	Frog	Green felspar	
Loose	2	Brit. Mus.	59472	Body of pectoral : base pierced with 6 holes	Faience, once green or blue	
		,,	59477	Scarab : head roughly marked : pierced	Black obsidian	
	3	Toronto		Two *uzats*		
	4	,,		Heart scarab : fragment inscribed with Book of the Dead, Chap. XXX, B	White limestone	
	5	,,		Human heart		
	6	,,		Ægis of a goddess		
Baqaria 18 ...		Buried		Two *uzats* : fragments	Black glass	
Baqaria 32 ...	8	Manchester		Hieroglyph : for inlay	Bone, with superimposed oval of red glass (corroded over)	Found at base of cow's neck
		Lost		Offering table (amulet)		Found in front of cow's neck
Baqaria 33 ...	8	Manchester		Ptah, or Khonsu (lower portion)	Light grey composition	
Baqaria R ...	7	Cairo		Model stela with bull or cow in relief, before offering stand. Above, the winged disk is roughly indicated	Limestone	
Tomb 205 (human)	9	,,		Two heads of bulls or cows	Faience	Græco-Roman (?)
	9	,,		Ram's head, wearing sun-disk	,,	Græco-Roman (?)

A. W. S.

CHAPTER XIV

BEADS

Bucheum and Baqaria.—Most of the beads from these sites are discussed by Shorter in the chapter on the funerary amulets. The only beads of importance remaining are those which formed the bead nets.

A bead net is portrayed on the mummified bulls in the stelæ, inscription numbers 17, 18 and 19 (Pls. XLV–XLVI). It is not shown on any of the stelæ in which the living bull is portrayed. Curiously enough, though the three stelæ which show these nets are Roman, no traces of such a net were found in any Roman burial, but only in the Ptolemaic, and for the most part in the Early Ptolemaic burials. Emery found a quantity of faience beads in Baqaria 30 and 31, but none occurred in any other Baqaria tombs. On Pl. XCV, Fig. 10, is shown a reconstruction of a section of these nets. The beads in this did not come from the Bucheum, since the originals were too fragile and faded to use, but were the closest in shape and colour that could be obtained. The general arrangement and pattern are correct, but there is considerable doubt about the order of the colours in the margin. When found (Pl. XCIX, Fig. 1), the beads were much decayed, on account of repeated wettings and dryings due to the rise and fall of the water level, and all colours except the black, which appears to be a metallic glaze, had faded to an almost uniform sand colour. In order to raise the beads, which crumbled when touched, it was necessary to set them in celluloid and this curled up when it dried, but the following facts were established.

The shapes of the beads, according to Mr. Horace Beck's *Classification and Nomenclature of Beads and Pendants* (Society of Antiquaries, 1928), were as follows :

The long beads of the net	.. Long cylinders	I.D.2.b.	(Green or blue).
The corner beads of the net	.. Oblates	I.B.1.a.	(Pink).
The beads of the edging	.. Oblate disks	I.A.1.a.	(Various colours).

The distribution of the colours in the edging was difficult to decide, partly because the colours were faded and partly also because of the broken state of the remains ; but it is certain that between each coloured chevron was placed a single row of beads of another colour. The colours certainly used were black, red, green and/or blue, and it is probable that yellow and white were also employed.

This net was found in Bucheum L, where there were otherwise few remains. It lay slightly to the north of the mummy and had evidently either fallen, or been thrown off the bull when the thread was still pliable and this had prevented its destruction by later plunderers. One side of the net was completely destroyed, but the other appeared to have measured a little over a metre in length, but this may be an underestimate.

Credit is due to Miss Scott for the very delicate task of raising these beads and for

reconstructing, under very difficult circumstances, the pattern and colour-scheme from such fragile remains.

The reconstruction of the net and the fragments of the original are at the Wellcome Historical Medical Museum.

The Baqaria Roman Village.—A quantity of beads was found in the village, all of which were without any associations with the exception of one string, about 50 cm. long.

Most of the beads in this string were pale blue faience barrel disks, I.A.1.b (Beck, *op. cit.*). There were also a dozen dark blue glass long cylinders, I.D.2.b (very roughly made), four imitation pearls, glass gilt collared spherical, I.C.1.a, one white glass ball-pendant,XXII, B.1.c, with a small knob at the base, and one carnelian ellipsoid, I.D.1.a. This string was found at R.A.I.

Few of the loose beads are worthy of notice. Though the bulk belonged, no doubt, to the Fourth Century A.D., there were several Arab beads and a number of dynastic date, the latter being probably the products of looting. The following among the loose beads are of interest : one white glass ball-pendant, XXII, B.1.c, one drop-pendant of the same material,XXII, B.2.a, and eight Bes amulets of various sizes, all in green faience with yellow high points. The great majority were blue faience barrel-disks, I.A.1.b.

The remainder do not merit description, since it is impossible to assign, with certainty, a date to any one of them.

O. H. M.

CHAPTER XV

WOODEN OBJECTS

ONLY three important objects of wood were found ; a head of Anubis, the remains of an Ibis on a sled, and fragments of some kind of mask.

The Anubis head is on Pl. XCVI, Fig. 1. It was found underneath the big dump to the north of the entrance, or West passage, and had to be saturated with wax before it was solid enough to move ; but although it was almost entirely eaten away by white ants, traces of paint could still be seen on it. It is now in the Cairo Museum.

(Height about 35 cm., length 48, width about 33.)

It was first conjectured that this might be a mask for the ceremonial entry of the priests into the Bucheum, for it is stated that the priests of Apis wore a mask of Anubis when conducting the mummy of Apis into the Serapeum, but the Bucheum object is too heavy for the purpose, and it probably belonged to a complete Anubis figure crouched on the top of a chest such as can be seen in the funerary outfit from the tomb of Tutankhamūn. It might also have rested on a sarcophagus. The closest parallel is the two jackals found by Mariette in the tomb of the Apis of Khā-em-Uas, though these objects were not of wood. Mariette describes them as follows : " Des niches étaient ménagées dans les murs. Celle de la paroi est contenait deux statues en grès de Schâ-em-Djom (Khā-em-Uas), . . . ; dans les deux niches de la paroi sud étaient déposés deux chacals en terre crue, accroupis sur un autel en forme de pylône ; chacun de ces autels renfermant, dans des trous ménagés par-dessous, quatre figurines en porcelaine émaillée, écrites au nom du personnage que Champollion a nommé Poëris." *Le Sérapeum de Memphis*, p. 62.

The remains of a wooden Ibis figure upon a sled are very puzzling (Pl. XCVI, Fig. 2.) Though they were fragile and very fragmentary, it was possible with the aid of beeswax to mend and strengthen the larger pieces, and this was done in the hope of being able to restore the missing portions. No similar figure has been discovered which might have assisted in this task. It will be seen from the photograph that the legs are far too large for the sled both in weight and length. The remaining portions of the legs are 32cm. in length and even if they were bent (they did not lie along the base) the total height of the bird could hardly have been less than 60 cm. against a total length of the sled of 25cm., and a width of 6cm.—an impossible proportion. There is no evidence that there was ever more than one figure and all the fragments were found together. It appears that the bird was wearing the Atef crown which is worn by the Ibis engraved on the stone doorway of the Baqaria. The body colour was buff, the legs and the crown (possibly also the body) were gilt, the sides and back of the leg supports and sled were blue.

This object is in the Ashmolean Museum, Oxford.

Mixed with the mud on the face of the stela which was found in position in front of Bucheum B, were a glass eye and eyebrow, the debris of another eye, and a quantity of small fragments of plaster, gilded, and painted red, blue, and black. More fragments of this were found on the

stone support upon which the stela stood, Pl. XCVIII, Fig. 4. Though much of this material was raised both with wax and with amyl-acetate solution of celluloid, it was impossible to preserve more than one eye, a drawing of which is shown on Pl. CXVIII ; nor was it possible to make out the form of the object to which the fragments belonged. The impression given was that of a wooden object, plaster-covered, which had rested on top of the stela and had been eaten by white ants, the final remains being knocked down by a fall of roof. The object appeared to be the mask of a bull, and the discovery in the text of the stela of the phrase : " May thy soul rest upon thy image " confirms this supposition. The exact form of the object cannot be decided. It might have been a bull-headed Ba-bird, but the Ba in the stela inscriptions is always shown with a human head. Baly suggests a revival of the Ka statue idea. The eye from this object is included in the register of eyes on p. 66.

A wooden pin and two fragments of others were found in the Baqaria village and part of a reel (?). (Pl. LXXXIX, Fig. 4). These are at the Chelmsford Museum.

The wood of the boards to which the mummy was fastened is discussed in the chapter on the mummies.

O. H. M.

CHAPTER XVI

THE RITUAL SIGNIFICANCE OF THE FUNERARY OBJECTS

By T. J. C. Baly

The objects with which this section deals may be divided into three main classes, with subdivision, as follows :

I. Purification and Funerary Rituals.
- (*a*) *Objects used in the Rituals.*
  1. The *nms.t*-jar.
  2. The small faience pots.
  3. The alabaster Rhomb.
  4. The *kbḥ*-vase.
- (*b*) *The Subsidiary Vessels.*
  1. The situlæ.
  2. The pottery.

II. Funerary Furnishings.
1. The stelæ.
2. The inscribed hieroglyphic private stela.
3. The sandstone stela with names in demotic.
4. The uninscribed sandstone stelæ.
5. The votive tablets.
6. The named pebbles.
7. The Hymn to Buchis.
8. The plaster " mask."
9. The offering tables.
10. The sandstone altar.
11. The burnt offerings.
12. The lamps.
13. The pottery.

III. General Funerary Objects.
1. The decorations of the Bull.
2. The bandages.
3. The false doors.
4. The model Ibis.
5. The wooden Anubis head.

This classification cannot be considered at all rigid ; it is merely the best of several possible

ones, and inside it further grouping will be necessary. Two points may be noted. The division of I into (a) and (b) is a division of those objects which are mentioned in the ritual texts from those which, though belonging to the same " cycle of use " are not so mentioned. The offering tables might have been placed with the *kbḥ*-vase with which they were used, but it has been thought better to place them in their present position ; chiefly because of their geographical connection with the stelæ.

The provenance of the objects has little bearing on their significance. As has been noted elsewhere (chap. XVIII) some of the stelæ and offering tables were found in position, and though it is uncertain how far these positions can be considered the original ones, this is hardly of importance in dealing with objects of such frequent occurrence. The position of the plaster " mask," however, may be of some significance and is discussed below in the paragraph dealing with that object.

Group I.—The large *nms.t*-jar and the small faience pots must clearly be dealt with together, as they belong to the same section of the ritual—the purification. The colour of the larger jar is perhaps its most interesting feature. One would expect it to be green from its parallelism with the *dšr.t*-jar, of which both the name and the material indicate the redness, but other examples are blue (e.g. Cairo 3731 " Himmelblau " and 3815 " Hellblau "), though this is admittedly not a great difficulty in view of the similarity of blue and green. The small pots belong to those sets of model implements for rituals, of which quite a number are known, and are in no way unusual. They are for the purification ritual.

The small alabaster rhomb is more difficult to explain. I cannot recall any published explanation of such an object and our first idea was that it was a weight. However, certain parallel objects in the British Museum[1] suggest to me that it is one of the four '*b.t*-blocks used in the " Opening of the Mouth " (episode 41). Gardiner[2] has suggested that these were chips of limestone and that they represented teeth. The latter suggestion seems the best so far put forward, but the material is more doubtful. The British Museum examples, if such they are, are also of alabaster and a similar block of the same material was found in a prehistoric tomb at Armant during the season 1931–32. The date of this is not, I think, an argument against the use here suggested, as the ritual is of great antiquity.

The *kbḥ*-vase (Pl. LXXVI, Fig. 3) is the last object in this group. As far as we have been able to ascertain there is no other example published, though it is an object frequently represented on tomb walls and elsewhere. It was used for the pouring of libations and occurs from the earliest to the latest times.

The situlæ, the first objects in the second section of group I, are of common form and the smaller one (Pl. LXXIV, Fig. 3) need not be considered here ; the larger one (Pl. LXXIV, Fig. 4 and LXXV), however, is of interest, as it bears an inscription which appears to be unique (Vol. II, p. 22).

The existence of a private situla bearing no reference to Buchis, in the dump-heaps, is curious. It is always possible, of course, that it was a votive offering, but I am inclined to the view that it comes from a private tomb which was disturbed during the excavation of the Bucheum.

[1] Dr. Sidney Smith, who has kindly had a search made, informs me that owing to the reorganisation of his department it is impossible at the moment to notify me of the numbers.

[2] Gardiner-Davies, *Tomb of Amenemhat*, p. 59. For the numbering of the Episode see Journal XVI, pp. 175 and 185.

The existence of such a tomb, whose contents were scattered over the dump-heaps, would also explain the occurrence in the same place of the miniature faience pots and the alabaster rhomb, which all seem too small to have been part of a bull's funerary equipment.

The pottery marked " Water for the Purification of the Bones of the Mother of Buchis," falls naturally into this section, but the whole question of the pottery is fully discussed elsewhere (chap. VIII).

Group II is rather a heterogeneous one, but numbers 1 to 6 may be discussed as a block, as they appear to be a connected series. First we have the official stelæ (Pls. XXXVII to XLVII, and Vol. II, pp. 2–21), which are of the normal type with a relief of the bull above the inscription. From the custom of erecting official stelæ arose, in very early times, that of erecting private stelæ, and by the time of the commencement of the Bucheum the dedication of private votive stelæ was well-developed.

Of this stage we have one example: Pl. XLVII, Inscr. 22. The next development was the stela with no inscription beyond the name of the dedicator, which is again represented here by one example: Pl. LXXIV, Dem. Inscr. 170. Following this, it would appear, come the stelæ with a design, but no inscription at all. We have two examples of this: Pl. LXI, Figs. 6 and 7. The final stage in this line seems to be the small votive tablets (Pl. LXII, Figs. 1–13) with scratched decoration on them. There is a certain amount of doubt as to what this decoration represents, but the most likely suggestion is that it shows the bull's head, with full regalia, full face (cf., the later Cow stelæ, Pls. LXI, Fig. 5 and CVIII).

The pebbles with names roughly written on them may be the next stage, and in actual practice probably were, but they seem more likely to have originated after the names dropped off the private stelæ, and to have run parallel to the two stages of uninscribed stelæ, since it is difficult to see why the use of names should be revived after a period of disuse. As suggested above, however, it is probable that with the decline of the " votive tablets " the named pebbles came to occupy the entire field. It may, perhaps, be suggested that the modern custom of dropping a pebble on a Sheikh's grave may have originated in these named pebbles and be the last stage in the development traced above.

Number 7 in this group—the Hymn to Buchis—seems to be a recrudescence of that " Religion of the Poor," the Nineteenth Dynasty form of which has been discussed by Gunn. Myers suggests to me that it may be fitted into the series dealt with above, but I am inclined to think that a personal hymn of this type belongs to a different " side " of religion from the " presentation of one's name " to the god.

The plaster " Mask " is a curious object and it is much to be regretted that it is not possible to state definitely its original form. It was found on the first Augustus stela, the inscription of which contains the following wish (Inscr. 13, 11, 2 3): ' Mayest thou traverse the Earth, mayest thou be united with the disk, may the rays of Rē' be beautiful in thy body, mayest thou settle down on thy image, and may it make excellent thy condition." This at first suggested to our minds the possibility of the fragmentary remains of plaster which we had, being those of a " B*ꜣ*-bird," which would suit the idea of " settling on " something. However, reconsideration of the passage and a careful examination of the eye remaining (Pl. CXVIII), seemed to invalidate this view. The eye is clearly not human, as one would expect in the case of a Ba-bird, and its likeness to those of the bulls suggested that the plaster had been in the form of a bull, or at least of a bull's head. It is, of course, possible that in the case of a bull the Ba-bird was itself given a bull's

head and the bull-headed ushabtiu from Saqqara might be quoted in support, but I know of no properly parallel cases, while the writing of " *Bꜣ-ʿnḫ-n-Rʿ* " with a human-headed bird (e.g. Inscr. 9, 1, 3) would seem to be evidence to the contrary. A model bull or bull's head, representing the bull himself, would be a suitable place for the spirit to return to; a reversion, in fact, to the original basis of the " *kꜣ*-statues."

The offering tables belong more or less with the sandstone altar and the burnt offerings. They were all used for food and drink offerings from the living to the dead, but none of them can be definitely worked into any of the rituals we have, though there are certain formulæ to be spoken and certain gestures to be performed when making offering. The sandstone altar is interesting since, though it is not unique, examples are not common. Their specific use is uncertain; our example may have been for small burnt offerings, as some resin was found in it. There is not sufficient published material as yet to permit of an examination of the history of the altar in Egypt, but it is a study well worthy of consideration.

Numbers 8 and 9 in this group fall together as most of the pottery here to be considered consists of lamps and lamp-stands. The lamps, as a whole, may well have no ritual significance whatsoever and have been merely for illumination; the tall lamps of rough pottery, however, are probably the lamps to be seen beside the tables of offerings in the temple reliefs and elsewhere. The shape, though degenerate, is much the same. It is possible also, that some of the rough bowl lamps were a cheap form of votive offering.

One pot may be considered here amongst the actual offerings, as it bore a dedicatory inscription and contained an offering. It is very interesting that we should find, at this period, a small offering to the god, authenticated with the giver's name.

Group III is a very general one, about which there is little to be said. The first section deals with the actual burial. The expression: " The Decorations of the Bull," is admittedly a vague one; it might fairly be considered to include the amulets, but, as has been noted above, these are dealt with elsewhere, and we have only to consider the Crown and Bead-net. Presumably the bull was decorated in death as he was on festive occasions in his lifetime, and we may expect the crown, of which no more than fragments have been found, to be the same as that represented in the reliefs. The net is probably that shown on some of the stelæ as over the back of the bull (e.g., Pl. XLV. Fig. 1); it seems probable that it was more than a mere device for keeping the wrappings in place, and the possibility that it derives from a netting thrown over the bull on ceremonial occasions to keep off the flies may be suggested.

The bandaging, in its mechanical aspect, has been discussed elsewhere (pp. 59–62) and though it is fairly certain on general grounds that the wrapping was a ritual process, we have little guidance concerning it.

The so-called " Ritual of the Burial of the Apis Bull " (*The Apis Papyrus*) is not very much more than a description of the mechanical side of the affair. The references to the use of " red linen " for the bull's veil, and, in bandages, for the priests, the shrine, and the bark, indicate some ritual basis, as does the lamentation when some of the cloth was cut. Unfortunately, we have no evidence from the excavated material to parallel this and from the point of view of the Bucheum, the ritual is unknown. We may, however, quote from the second Augustus stela (Inscr. 14, 1–8) where Anubis is said to raise his arms to Buchis " with the divine wrappings which are loosed from the body of the great god," which hints at some form of identification of the bandages with those of Osiris, as indeed might be expected.

The False Doors need not detain us, as they are of a completely ordinary type and merely indicate that " reversion to type " in religious practices which has been noted elsewhere.

The wooden sled and the remains of a bird's figure, including fragments of the crown and uræus which it must have worn, are difficult to parallel. From the length of the legs it seems fairly certain that they are the fragments of an Ibis. Such models are not unknown in the case of the Nome-signs (cf. those from the tomb of Tutankhamūn) but it is more difficult to find examples of an ibis in our form. The only published example I can discover is that in the Berlin Museum. It is not without interest in this connection that on the stone gateway in the Baqaria (Pl. LXXVII, Fig. 1) was found, roughly scratched, the figure of an Ibis wearing a feathered crown and further, that in the Bucheum was found a block representing Nekhthor-heb making offering to Thoth. Was there some particular connection between Buchis and Thoth ?

There are various possibilities for the origin of the wooden Anubis head. Our first idea was that it was one of the masks which we know were worn by the priests during certain of the ceremonies, and in some ways this is still the most attractive of the theories, but the great weight of the object, and the apparent absence of air-holes for the wearers' breathing, seem against it being for this purpose. The two other suggestions are that either it was a part of a chest with Anubis on it, such as has been found in the tomb of Tutankhamūn or, and of these latter this seems to me the more attractive, that it was one of those figures of Anubis which are found on the coffins of the late period (e.g., Erman *Aeg. Rel.* auf. 2, abb. 119). Its larger size would well be accounted for by the difference in size between a human and a bovine coffin.

T. J. C. B.

CHAPTER XVII

THE OSTEOLOGY

Report on the remains of Sacred Cattle from the Baqaria and Bucheum, Armant, Upper Egypt.

By J. Wilfrid Jackson,
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Introduction.

I am indebted to Sir Robert Mond, the President of the Egypt Exploration Society, and to Sir Henry Wellcome, of the Wellcome Historical Medical Museum, for the opportunity of visiting Egypt in the winter of 1931–1932 in order to study the remains of sacred cattle found in the underground chambers known as the Baqaria and Bucheum, near Armant. I have also to thank Mr. O. H. Myers, the director of the Armant Expedition, and the members of his staff for assistance and for providing facilities for the study to be carried on in the Society's camp at Bucheum House.

Most of the cattle remains came from the Baqaria, but, unfortunately, many were very imperfect, consisting in some cases of the bones of the skeleton without the skulls. The remains from this burial-place comprised seventeen animals in all, viz., two complete skeletons of cows, Nos. 29 and 32 ; an imperfect skull and a few limb-bones of another, No. 4 ; and various bones of other cows, Nos. 6, 8, 9, 10, 16, 17, 18, 19, 22, 23, 24, 26, 28 and 33. From the Bucheum there were only scanty remains of two bulls, lettered G and H.

Wherever possible, measurements of the skulls and the limb-bones were taken, and many of these are included in this report in the hope that they will prove of service in future work. The skeleton and skull of the cow No. 29 from the Baqaria provided the most measurements. The skull of the cow No. 32 from the same place was in a mummified condition and the wrappings prevented many particulars being obtained. The skull of cow No. 4 provided a few useful measurements. In the case of the skulls, the points of measurement are mainly those of Dr. J. Ulrich Dürst (*Die Rinder von Babylonien, Assyrien und Agypten und ihr Zusammenhang mit den Rinden der alten Welt*. Berlin, 1899). Comparisons with Dürst's material and that of Lortet and Gaillard (*La Faune Momifiée de l'ancienne Égypte : Archives du Museum d'histoire naturelle de Lyon*, tome VIII, 1903, pp. 41–71 ; tome IX, 1907, pp. 54–68 ; and tome X, 1909, pp. 85 *et seq.*) have been made and are mentioned in the report. In addition, reference is made to Dürst's report on the animal remains from excavations at Anau, Turkestan (in R. Pumpelly, *Explorations in Turkestan*, Vol. II, 1908, Carnegie Institution of Washington) and to material in the Museum of Antiquities in Cairo, which I was able to examine through the courtesy of Mr. R. Engelbach.

DESCRIPTION OF THE SPECIMENS.—SKULLS.

Cow No. 29 from the Baqaria. See photograph (Pl. XCVII, Fig. 2).

This consists of a complete skeleton together with the skull and lower jaws. According to Mr. Myers, it was found solitary. The skull and lower jaws are in a fairly perfect state : they are rather small and at first sight resemble very closely those of the Celtic Shorthorn (*Bos brachyceros* Owen=*longifrons* Owen), many examples of which I have examined in recent years. The horns, however, are somewhat different ; they are longer, of half-moon type, and proceed from the skull in a different manner. Some of the dimensions are given in the adjoining Table of Measurements ; but certain features may be mentioned here. As in the type specimen of *Bos brachyceros* (preserved in the Museum of the Royal College of Surgeons, London) as well as in others which I have studied, the skull possesses a well-marked indented mesial prominence on the frontals between the horns. A slight ridge extends forward from this along the median line of the frontals.[1] This frontal prominence projects but little over the occipital plane. The horn-cores are nearly circular at their bases, measuring 37 x 34mm., and each horn extends upwards and outwards and then inwards in an even crescentic curve, recalling those of the Chillingham breed. The horns are damaged, but the length along the outer curve is about 313mm., and the tips are about 150mm. apart. The distance between the outermost parts of the horns is about 315mm. The premaxillæ (or intermaxillæ) are well connected with the nasals, and thus differ from typical *Bos brachyceros* (though there seems to be some variation in this respect). The occiput is nearly at right angles with the frontals (as in typical *Bos brachyceros*) and is roughly quadrangular in outline. The occipital crest, limiting the upper part of the somewhat triangular occiput proper, is arched and is separated from the horn-bases on each side by the deep notches of the temporal fossæ. These infracornual notches are 108mm. apart. Below the centre of the crest is a shield-like projection for the insertion of the ligamentum nuchæ. The distance from the crest to the lower border of the foramen magnum is about 95mm.; the maximum width of the occipital condyles is 88mm. and the greatest width of the occiput is 169mm. The supracrestal part of the occiput, between the horn-bases, measures about 49mm. in depth under the frontal prominence. The central part is slightly hollowed, but there is no overhang of the supracrestal part over the occiput proper.

The atlas associated with this skull measures 125mm. in its maximum width.

Cow No. 32 from the Baqaria. See Photograph (Pl. XCVII, Fig. 1).

Owing to the wrapped condition of this skull it was only possible to obtain a few measurements and these are given in the adjoining table. The skull is slightly larger than that of No. 29 ; the occipital region is notched under the horns in a similar manner, but the frontal mesial prominence is not present, the frontal being flat. The width between the infracornual notches is 122mm. The horn-cores do not curve upwards so quickly as in No. 29 ; they are broken off, but appear to be of the same general type, i.e., half-moon shape. The basal diameters of each are 48 x 40mm., and the basal circumference, 140mm. The extreme width of the associated atlas is 129mm.

Cow No. 4 from the Baqaria.

The skull of this animal is very imperfect, but shows several interesting features. The

[1] The same type of frontal is present in two polled-skulls of ox collected from Pan graves in a cemetery to the south of Bucheum House.

dimensions obtained are given in the table. It possesses a frontal mesial prominence, as in No. 29, and a notched occiput, as in Nos. 29 and 32. The horn-cores are broken, but the part remaining shows that they were like those of the other two skulls. The basal diameters are 50 x 35mm., and the basal circumference, 135mm. The premaxillæ reach the nasals, as in No. 29. In the lower jaw of this skull the alveolus for PM2 is very small, suggesting an approach to a five-toothed condition.[1]

The sizes of the above skulls are less than those of the skulls of long-horned oxen from the Serapeum at Sakkara, described by Lortet and Gaillard (*op. cit.* 1903, 1907 and 1909). No. 29 is markedly less, being 39·3cm in length from the frontal crest to the tip of the premaxillæ, and 16·8cm. in maximum width over the orbits ; No. 32 is about 45·2cm. in length (the width could not be ascertained) ; while No. 4 is 43·5cm. in length and 19·3cm. in width. In the Sakkara skulls the corresponding sizes are : length, 46 to 56cm. ; maximum width, 20 to 27cm. The ratio of length to width in these ranges from 0·40 to 0·48 ; in the Armant skulls it is, No. 29, 0·42, and No. 4, 0·44, so that the relative proportion is very similar.

Compared with four ancient Egyptian ox skulls of the same long-horned *Bos macroceros*-race described by Dürst (*op. cit.*, 1899), the Armant skulls are smaller than the Apis[2] in Berlin, length, 49·5, width, 23·2cm., ratio, 0·46 ; and the Apis in Halle, length, 51, width, 24·9cm., ratio, 0·48. The Armant skull No. 32 is longer than that of a sacrificial ox from the tomb of Antef, Prince of Hermonthis, in the Berlin Museum, length, 44·5, width 20·1cm., ratio, 0·45. This Antef skull is noteworthy in possessing a frontal mesial prominence, and, judging from the figure (Dürst, *op. cit.*, 1899, Pl. V, Fig. 1), the orbits are very prominent and situated closer to the horns. The fourth skull, of a small Apis in the Vienna Museum, is, length, 38·5, width, 20·1cm., ratio, 0·52 ; this is broad in relation to its length. The Armant skull No. 29 is longer than this, but is narrower in the face. All four of the above skulls possess larger horn-cores than the three from Armant.

Through the kindness of Mr. J. D. S. Pendlebury, I was enabled to examine some remains of oxen found at Tell El 'Amarna. These were submitted to me at Bucheum House, Armant, and I am reporting upon these and some remains of sheep in a separate communication. It will be of interest, however, to briefly compare these Eighteenth Dynasty remains with the Armant material. The Tell El 'Amarna ox skulls were three in number, lettered I (adult), II (slightly immature), and IV (juvenile). The adult skull is the most interesting for the purposes of comparison, though the other two exhibit some important details, especially the somewhat immature example II. In 'Amarna I the horns are of the half-moon type as in the three Armant skulls, but the horns are larger ; the frontal crest is flat as in No. 32 and not arched, as in Nos. 29 and 4 ; the premaxillæ intrude into the nasals as in Nos. 29 and 4, and the occiput is similarly notched below the horn-bases. On the whole, the ox skull I from 'Amarna is somewhat larger than No. 29, but the upper and lower dentition agree closely in dimensions. The 'Amarna skull II is of the same flat-fronted type as I, and though not quite adult is of the same size ; it also

[1] See *Notes on the Degeneration of Teeth in Oxen and Sheep*, by J. Wilfrid Jackson, *Ann. Mag. Nat. Hist.*, Vol. 15, 8th series, 1915, p. 291.

[2] Most of the known mummies of cattle have at one time or another been described as Apis mummies, but this is extremely improbable seeing that there is none which shows even the same degree of care in mummification as is shown in the mummies of the Mothers of Buchis. It seems probable that these are in reality nothing more than mummies of cattle buried ceremonially during the Græco-Roman period, in the neighbourhood of a sacred cemetery.

shows the intrusion of the premaxillæ into the nasals, a feature which occurs in the young skull IV.

It may be noted in passing that in six skulls of oxen in the Cairo Museum, from Sakkara and Abousir, the premaxillæ join the nasals.

In addition to long-horned cattle, Dürst (*op. cit.*, 1899, pp. 73, etc.) refers to a middle-horned humpless race in Egypt during the Old and New Empire. As representatives of this race he briefly describes a wrapped skull of an Apis in Vienna, and more fully that of a young sacrificial bull from the tomb of Mentuhotep now in the Berlin Museum. Dürst further describes a series of humped, short-horned cattle of the *Bos brachyceros*-race from different countries. This race appears to have been present in Egypt during the New Empire.

It is unfortunate that the skull of the Vienna Apis is in a mummified condition, thus preventing its complete description, and that the Mentuhotep skull is immature, which renders it unsuitable for close comparison with the Armant skulls. Judging from the illustration of the latter skull given by Dürst (*op. cit.*, 1899, Pl. V, Fig. 2), there is some resemblance between it and skull No. 32 from Armant.

A comparison of the Armant skulls with those of the short-horned race of Dürst shows some resemblances as well as some differences. In many dimensions, No. 29 and, to some extent, No. 4 from Armant agree closely with the Syrio-Mesopotamian and Asia Minor oxen, but the horns are much larger and thicker at the base ; the premaxillæ, too, reach the nasals. In the Somaliland and Nubian cattle the horns are much larger than those of Nos. 29, 32 and 4, and these oxen appear to have larger heads.

An analysis of Dürst's figures (*op. cit.*, 1899, Table on page 84) suggests a division of these short-horned, humped cattle into two groups, the oxen of Somaliland, Nubia and Egypt (identical with New Empire form) being a closely allied group, the ratio of the length to the width of the skull in all three being 0·37 ; and the ratio of the greatest to the least width of the occiput being respectively 0·69, 0·70 and 0·68 ; while the others, which include the Syrio-Mesopotamian and Asia Minor oxen, fall into a second group with a frontal length-width ratio of 0·41 to 0·43, and an occipital ratio of 0·62 to 0·65. In the Armant skulls Nos. 29 and 4 the frontal length-width ratios are 0·42 and 0·44 respectively, and the occipital ratio in No. 29 is 0·63.

Description of the Specimens.—Limb-Bones.

The dimensions in centimetres of some of the limb-bones of Cow No. 29 are as follows : Fore-limb : humerus, 28·5 over all, 6·2 distal condyles, 2·8 mid-shaft : radius : 29·1 over all, 5·8 distal articulation, 3·2 mid-shaft ; metacarpal : 20·7 length, 5·1 distal articulation, 2·5 mid-shaft ; Hind-limb : femur, 32·4 head to condyles, 7·8 distal condyles, 2·75 mid-shaft ; tibia, 34·9 over all, 5·2 distal articulation, 3·3 mid-shaft ; metatarsal, 23·7 length, 4·7 distal articulation, 2·1 mid-shaft ; calcaneum, 12·9 full length ; astragalus, 6·1 full length. The sacrum, of five bones, is slightly curved and measures 19·5 length by 16·5 width.

The bones of Cow No. 32 measure : Fore-limb : humerus, 28·5 over all, 6·4 distal condyles, 3·0 mid-shaft ; radius, 28·4 over all, 5·8 distal articulation, 3·5 mid-shaft ; metacarpal, 20·5 length, 5·3 distal articulation, 2·9 mid-shaft ; Hind-limb : femur, 32·5 head to condyles, 7·9 distal condyles, 3·1 mid-shaft ; tibia, 33·9 over all, 5·6 distal articulation, 3·6 mid-shaft ; metatarsal, 23·2 length, 4·9 distal articulation, 2·6 mid-shaft ; calcaneum, 12·5 full length ; astragalus, 6·2 full length. The sacrum, of five bones, is slightly curved, but has a strong crest and measures 21·1 length by 16·5 width.

The few associated bones of Cow No. 4 comprise a left humerus, 32·4 over all, 7·0 distal condyles, 3·5 mid-shaft ; a metacarpal, 21·6 length, 5·9 distal articulation, 3·3 mid-shaft ; also three phalanges and an atlas.

Of the remaining cow material from the Baqaria the dimensions of some of the bones are given in the adjoining table.

The remains from the bull-burials at the Bucheum are, unfortunately, very scanty, and this prevents a close comparison with those from the Baqaria. They comprise : G, a few perfect and imperfect but robust bones and fragments of jaws ; also the tip of a horn-core ; H, fragments of horn-cores and scraps of bones. The dimensions of a few of G are given in the table.

Dimensions of the limb-bones of ancient Egyptian oxen appear to be scarce. I have only been able to find a few given by Dürst (*Anau Report*, *op. cit.*, 1908) which are useful for comparison with the Armant material. These are the measurements of the bones of an Apis bull in the Paris Museum. From these it is seen that all the remains of the cows from the Baqaria are smaller than the Paris Apis, some very much smaller. The metatarsal of the bull G, from the Bucheum, however, agrees closely with that of the Apis.

Compared with bones of *Bos brachyceros* Owen (=*longifrons* Owen) from Early Iron Age sites in Britain, the bones of the Armant cows are much longer and stouter.[1]

[1] See reports by the author in *The Glastonbury Lake Village*, Vol. II, 1917 (Animal Remains) pp. 641-672 ; *The Early Iron Age Inhabited Site at All Cannings Cross Farm, Wiltshire*, 1924 (Animal Remains) pp. 43–50 ; *Wilts. Archæol. and Nat. Hist. Mag.* Vol. XLII, 1924, pp. 492–3 ; *Wilts. Archæol. and Nat. Hist. Mag.* Vol. XLIII, 1925, pp. 90–93 ; and *Proc. Spelæol. Soc. Bristol*, Vol. 2, No. 1 (1922–23), pp. 55–58.

Measurements of Skulls of Armant Oxen.

		29	32	4
		cm.	*cm.*	*cm.*
1.	Frontal crest to anterior point of intermaxillæ	39·3	45·2	43·5
2.	Frontal crest to root of nasals	18·1	—	—
3.	Posterior border of horn-core base to posterior border of orbit	13·2	14·3	14·5
4.	Least frontal width	13·5	14·6	13·9
5.	Greatest frontal width (over orbits)	16·8	—	19·3
6.	Frontal crest (between bases of horn-cores)	11·7	—	—
7.	Length of nasals	12·6	—	14·9
8.	Greatest width of nasals	4·7	—	5·4
9.	Frontal crest to lower border of foramen magnum	14·4	—	—
10.	Occipital crest to lower border of foramen magnum	9·5	—	—
11.	Greatest width of occiput	16·9	—	—
12.	Least width of occiput (between infracornual notches)	10·8	12·2	12·2
13.	Outer width of occipital condyles	8·8	9·7	—
14.	Anterior border of foramen magnum to anterior border of intermaxillæ	37·6	—	—
15.	Breadth of palate behind molars	6·5	—	8·0
16.	Breadth of palate in front of premolars	6·8	—	6·75
17.	Length of palate	22·5	—	26·5
18.	Length of three upper molars	7·75	—	7·8
19.	Length of three upper premolars	5·2	—	4·9
20.	Length of toothless part (from PM2 to tip of intermaxillæ)	12·3	—	13·6
21.	Length of lower jaw	34·6	—	—
22.	Length of lower molars and premolars	13·5	—	13·7
23.	Length of toothless part	9·0	—	10·0

TABLE OF MEASUREMENTS OF LIMB BONES OF ARMANT OXEN.

Cow No.		Length	Width of distal condyles	Diameter of mid-shaft
		cm.	*cm.*	*cm.*
4.	Metacarpal	21·6	5·9	3·3
10.	,,	22·1	5·4	3·1
16.	,,	20·9	6·25	3·55
17.	,,	21·3	5·5	2·85
18.	,,	21·7	6·4	3·7
24.	,,	21·6	5·65	3·05
29.	,,	20·7	5·1	2·5
32.	,,	20·5	5·3	2·9
6.	Metatarsal	25·4	5 ·45	2·9
9.	,,	24·2	5·1	2·7
10.	,,	25·7	5·15	2·8
19.	,,	26·7	6·0	2·9
22.	,,	24·0	5·05	2·55
23.	,,	22·8	—	2·7
26.	,,	26·0	5·6	2·9
29.	,,	23·7	4·7	2·1
32.	,,	23·2	4·9	2·6
Bull G.	,,	24·7	6·3	3·45

TABLE OF MEASUREMENTS OF LIMB BONES OF ARMANT OXEN.

Cow No.		Full length	Full width.
		cm.	*cm.*
6.	Astragalus	7·4	4·7
10.	,,	6·7	4·4
16.	,,	7·0	4·5
17.	,,	6·6	4·2
18.	,,	6·6	4·9
19.	,,	7·3	4·5
22.	,,	6·0	4·3
23.	,,	6·2	4·4
28.	,,	6·7	4·55
29.	,,	6·1	3·95
32.	,,	6·2	3·9
Bull G.	,,	7·2	4·9

TABLE OF MEASUREMENTS OF LIMB BONES OF ARMANT OXEN.

Cow No.		Full length	Mid-shaft diameters
		cm.	*cm.*
6.	Calcaneum	13·6	3·8 x 2·3
10.	,,	14·0	3·4 x 2·75
16.	,,	13·8	3·7 x 2·0
17.	,,	13·1	3·5 x 1·7
18.	,,	14·3	2·9 x 2·0
19.	,,	15·0	3·9 x 2·9
29.	,,	12·9	2·8 x 1·35
32.	,,	12·5	3·45 x 1·6
Bull G.	,,	15·0	4·0 x 2·2

J. W. J.

CHAPTER XVIII

THE EXCAVATION AND DISCOVERY OF THE OBJECTS

A FEW of the difficulties encountered in the excavation of the site are mentioned in the appropriate sections, but it is as well to recapitulate them here, since these have a bearing upon the general results of the work.

The rock in which the Bucheum and Baqaria were excavated is for the main part a grey-green marl. Near the surface are layers of sand alternating with a gravel conglomerate similar to concrete. At the south end of the Bucheum a brown, chocolate-like vein of clay was struck. This is a Nile deposit, shallow in the neighbourhood of tombs B and C and thickening rapidly towards the Nile, but disappearing before the edge of the low desert. It was found in the northern tombs of the 200 cemetery, but was not present in those near the '*Ezba*. All these rocks are treacherous, the brown clay being especially dangerous. When attacked from above it proved hard and unyielding, but when undercut it crumbled away as it dried and then formed a very dangerous roof. The green marl had similar characteristics but to a lesser degree. In almost every tomb it was found necessary to dig straight down from the surface to ensure the safety of the men, and this, as well as adding greatly to the cost and time taken in excavating, increased the difficulties of the surveyors.

Water was a source of great trouble, not only in making excavation more difficult but also in the destruction it had wrought among the remains. All the tombs in the south of the Bucheum were under water level, as well as tomb 16 in the North passage. None of the others which we cleared was absolutely dry, and even in those which dried out after prolonged exposure to the sun, the objects were extremely fragile owing to the repeated wettings and dryings which they had suffered. Moreover the drying process was dangerous on account of the risk to the objects from wind and from falling lumps of rock. The tombs in the south end of the Baqaria were on water level and could be dried out in a similar manner to those in the north of the Bucheum, but they had suffered more from damp. Tomb 33 was under water, and 32 was the only example which was really dry. Excavation either under water, or while water is being baled out, cannot but be crude work, however much trouble is taken, and though it is possible to measure a sarcophagus under water by attaching a tape to one's big toe, the results have not that degree of accuracy which it is desirable to achieve.

White ants were troublesome, partly because of their destruction of ancient objects, and partly on account of their habit of eating the pegs put in by the surveyors.

Problems caused by the repeated falls of rock and subsequent repairs in ancient times are considered in the chapter on architecture (III), but their effect upon the evidential value of the positions of the stelæ and other objects is equally important. At first sight it seemed as if the positions of the stelæ would alone be sufficient evidence to date the tombs and this would have

been so had the stelæ been embedded in the tomb blockings as were the official stelæ in the Serapeum. (Les . . . stèles officielles . . . étaient encastrées au milieu du mur qui servait à fermer la chambre de l'Apis auquel elles se rapportaient. Les unes ont étés trouvées jétées pêle-mêle au milieu des décombres du souterrain. D'autres étaient encore à leur place antique." *Le Sérapeum de Memphis*, pp. 54, 55.) Unfortunately in the Bucheum they only rested against the front of the blocking, standing on a stone slab. There is no doubt that, whenever a section of roof collapsed, they were temporarily removed and often replaced wrongly. Outstanding examples were the stela of Ptolemy II and the fragment of a stela of Alexander the Great, both found outside H. Fragments of a stela of Ptolemy VII were found under a burnt brick buttress outside K, and further fragments in a rubbish heap by the entrance, while the stela itself was found by Dr. Frankfort, either to one side of the same brick buttress, or outside 11.

The positions of offering tables and pottery must be regarded with even greater suspicion. Pottery containing burnt offerings might well be placed in front of a tomb at any period subsequent to the burial, and offering tables, which projected into the passageway, were probably moved and misplaced. The only datable offering table from the Baqaria was Ptolemaic, and was found outside a Roman tomb in the South passage. Thus it is only from the objects found inside the tombs that satisfactory deductions can be drawn.

Plates XCVIII to C illustrate the discovery of some of the objects. Pl. XCVIII, Fig. 1, shows the Antoninus Pius stela and two offering tables (Inscr. Nos. 17, 34 and 36) as they were found inside Bucheum 7a. Fig. 2 is a photograph of a reconstructed burial. From our own experience the stela should be on a flatter slab and the offering table actually on the ground. Fig. 3 shows the fragments of the Ptolemy VII stela (Inscr. No. 10) which were found under a burnt-brick buttress outside K. Fig. 4 shows a white card in the position in which the first Augustus stela was found. This stela is shown in position in Fig. 4 of Pl. XXVI, but that photograph is not very clear and much clearance took place before the second photograph was taken. Fig. 4 of Pl. XCVIII shows the two pots found in Bucheum T, a space behind the wall at the extreme south end of the South passage which never contained a burial. Figs. 5, 6 and 7 illustrate the position of the Ptolemy V stela (Inscr. No. 7). This stela was discovered at a time when the passage had not been cleared and it was necessary to raise it from the rear. To do this the mud walling of the tomb, against which it had originally rested, had to be cut through. By good fortune the stela had fallen forward in such a way as to preserve the colours on the relief. Fig. 6 shows the remains of the original mud filling, while in Fig. 5 the damage done to the wall has been repaired to give the position of the stela, and bricks have been placed on the left of the photograph (north of the entrance) to show where the side wall originally ran. The fact that the mud wall was built against a fall of rock can also be seen here. On the south of the same tomb a row of bricks was wedged anciently into a crack in the rock wall where a sandy layer had run out. In Fig. 7 all the filling in front of the blocking has been cleared down to native rock and two further levels exposed. The lowest, the top of the ramp, was probably filled up to the level of the rock on the right, where the pottery can be seen, when the tomb was first blocked. The debris between this level and the highest level—at which the stela was found—must belong to the collapse, after which the mud filling was inserted. This is illustrated in the other two figures. Fig. 8 shows the uninscribed stela cut into the front of the inside of the sarcophagus in Baqaria 31.

Pl. XCIX, Fig. 1 shows the remains of the bead net in Bucheum L as it was found. The

divisions on the ruler are centimetres. A full description of the conditions of the finding of this is given in Chapter XIV. Figs. 2 and 4 illustrate the methods of the robbers in the Bucheum. They tunnelled through from tomb to tomb instead of working along the passage and breaking in the tomb entrances. It is possible that they worked while the Bucheum was still in use, in which case they could obviously have done so without being observed, if they kept out of sight and did no damage in the passages. It is known that robbing took place during occupation, because of the evidence of the repaired sarcophagi of the monolithic type, but at an earlier date than the tunnelling shown here. But this explanation is very doubtful, for some tunnels emerge into the passage ; viz, the tunnel opposite 11 where the stairway was found. The most likely reason for their conduct is that there were falls of rock in the passages, which made them unsafe for work, whereas in the backs of the chambers there was no danger from collapse. In Fig. 2 the end of the tunnel can be seen entering H from 14, and on the right a crude wall of burnt-brick, put up by the robbers to prevent falls of rock or debris. In Fig. 4 can be seen the hole bored through the side of the coffin for entry. The reason for this is not clear, for the coffin, having a slab roof and not a monolithic one, was easy to enter from above. As can be seen from the roofing slab standing horizontally on the right of the photograph, and the debris below the hole, the roof collapsed during the robbery, forcing the plunderers to erect a crude brick wall after they had bored through the sarcophagus.

Fig. 3 is of a lamp found underneath the passage wall in the Baqaria North passage. The pot belonged to tomb 2. The crude construction of the wall can also be seen in this photograph.

Fig. 5 shows the dynastic and other pottery found inside the vault of Baqaria 30, beside the lid of the coffin. Fragments of a similar pot were found carrying a hieratic inscription (No. 44).

Fig. 6 is a pile of broken amphoræ found above 4 and 15 in the north end of the Baqaria. It seems likely that these had nothing to do with the site, and were thrown in from above by the inhabitants of the Baqaria village, after worship had ceased.

South of the West passage of the Bucheum, near the entrance, were found the remains of plaster mixed during one of the periods of construction, the date of which cannot be determined. It was mixed, partially at least, in a large pot let into the ground, parts of which were found and can be seen in Fig. 7.

On Pl. C, Fig. 1 is shown in position the Demotic block 0.200, translated by Prof. Griffith in Vol. II, Chap. II. It is in the bay outside Bucheum 22, and the second stela of Augustus found in 1928–29 must have rested on it, or very closely above it. Fig. 2 is a photograph of the limestone hawk in position by the column base OA, and is discussed in the architectural chapter, p. 36, Figs. 3, 4 and 5 show the finding of offering tables and of the stela in the south end of the Baqaria. Those outside tombs 20 and 25, Fig. 3 and tomb 21 (top left of Fig. 4) are certainly in position as the users of the Baqaria left them, though as certainly not in the position they originally occupied. That which has been called P. 27 (passage outside 27), judging by its position, should probably be attributed to 28. It is on the left in Fig. 5. It is difficult to decide the original positions of the stela and the offering table P. 26 as they were disturbed when found, but the former undoubtedly belonged to 27 or 28, probably the latter.

Fig. 6 shows the pottery chest of Baqaria 29 in relation to the remains of the brick building which surrounded it. The burial was parallel to the base of the triangle forming the plan of this chest.

Photographs were obtained of every cow mummy which we found, but it would be unneces-

sary to reproduce all these in addition to the scale drawings of each burial which are on Pls. CXV–CXVII.

Baqaria 32 was found in better condition than most, and was very carefully cleared. There was no need to wax it, as two mummies had been removed whole before this one was found. The process of clearing is shown on Pl. XXXIII. In Fig. 1 the face and the eyes are seen appearing above the filling. It is clear that with a fall of the head the eyes became detached and were left above the soil which had already filtered in. The horns were mostly decayed. Figs. 2 and 3 show the next stage when the greater part of the mummy has been exposed. The eyes have been removed but everything else is still in position, including the remains of the wrappings, caked hard with resin. It can be seen from the back view that the head must have fallen considerably, the neck collapsing and the rear part of the head falling back. Both the position of the eyes in Fig. 1 and that of the headrest in Fig. 5 confirm this diagnosis. The base of the mummy is rectangular, except at the back, where it is curved. This shape represents that of the board. In Fig. 4, the head has been removed and the skeleton laid bare of wrapping- and flesh-remains. Two bronze clamps will be seen, one each side of the figures 32. Fig. 5 shows the headrest, which was placed in front of the chest and supported at the angle between the head and the neck. When the head fell back the stem of the rest was smashed. Fig. 6 gives the position of the hind-quarters. The tail, it will be noticed, curled round under the leg in a more natural position than the other members of the body. The position of the mummies, as can be seen from this figure and from Fig. 5, was formalised into that of a dog (Anubis ?). Much stretching must have been necessary to get the front legs into the straight out position (see p. 58), and that of the rear legs is quite incorrect for cattle, although natural for dogs.

Both Baqaria 14 and 7 contained undisturbed mummies which were preserved. The mummy was first uncovered and photographed (Pl. XXXIV, Fig. 1). The skeleton was then stripped of all decayed remains of linen, etc., which were not worthy of preservation. Fig. 3 is a composite picture of the mummy at this stage. The amount of distortion can be gauged by the vertical string which was really at right-angles to the horizontal. There is a headrest like that in Baqaria 32, and a small wooden rest under the chin. The next stage was the use of smoking hot wax to penetrate thoroughly the bones and the board, thus strengthening all the remains. Throughout this process great care was needed, since wax as hot as this does not hold together loose fragments or bones, for which a cooler wax is required. It was also necessary to ensure that the wax penetrated to the bottom of the board but not too far below it ; since the depth varied from one to forty centimetres, this was no easy feat. The success of this operation can be gauged from Fig. 2, which shows the bottom of the board immediately after the mummy was turned over. It will be seen that practically nothing was lost and that no great depth of soil was waxed onto the base ; but it was not possible to turn the mummy over until it had been converted into a sufficiently stable block to stand transport. This was done by the use of wax and cotton wool. Retaining walls of " puddle-wax " were made at various places so as to form traps and to prevent the wax running off the object. (Puddle-wax is soft and pliable and is made by pouring hot wax into cold water.) These hollows were then filled with cotton saturated in wax. This makes a firm filling somewhat less weighty than solid wax. When the consolidation was complete, the body was turned over. It was an anxious moment when this was attempted, but, fortunately, the result was completely satisfactory. Fig. 4 is a photograph of the mummy when half converted into a solid block. The mummy from Baqaria 7 was waxed

in toto except for certain pieces of gilded plaster, which had slipped from their original positions and had to be removed separately. The process of waxing was very similar to that employed for 14, but as the head was leaning to the left it was necessary to give this extra support. This was done with two wooden props, wire struts, and wire-netting, all of which were embedded in wax, in a manner similar to that of ferro-concrete construction. It was impossible to uncover the whole of this mummy at one time, for the head would have fallen over and all the gilded plaster fallen off. It was essential to wax the upper portions temporarily with cool wax before uncovering the lower parts. This preliminary coating was then melted in places to allow hot wax to be poured in to penetrate the base of the mummy. It was found that when a fine spray of the tubular type was wrapped with a thick layer of felt, for insulation purposes, it could be used to make the wax penetrate without great difficulty. Wax a little short of combustion point was used and the spray filled and refilled several times in the liquid to ensure thorough warming. This instrument was most useful for injecting wax upwards or sideways, a feat which it is almost impossible to do with a spoon without washing away fragments of the surface. Cold wax does not melt readily and it was found possible, with cool wax, to attach to the body loose pieces of linen wrapping, which had set into a solid mass with resin lacquer and had cracked in the course of time. Later the inner parts of the mummy were impregnated with smoking hot wax without detaching these fragments from the surface. The waxing of these two mummies took five weeks to do and the work was almost entirely done by Fairman, who spent all this time in a stuffy tent, for it was necessary to erect this over the tomb to protect the mummy from the sun. The atmosphere in this tent is difficult to describe, being composed of a mixture of the odours of melted wax, frying bull, and garlic. It is pleasant to be able to report that both mummies reached their destination safely.

Another unrobbed mummy was found in Baqaria 17, and this is shown in Fig. 5. Pl. XXXV illustrates various mummies, robbed and unrobbed. Baqaria 29 should be especially noticed owing to its complete difference from all the other examples. Some sherds were found over the head and a coil of cord is visible on the left of the photograph, by the forefeet of the body.

The amulets and beads, though not *in situ* when found, can safely be attributed to the tombs in which they were found. It is not impossible for some to have found their way into the wrong tombs, but internal evidence gives no support to this theory. The same applies to most of the eyes. A few were not found actually in their tombs. The mummy eye from Bucheum B was high in the filling above the tomb. The eye from Bucheum 10 was not inside the tomb. That from Bucheum 19, which was a passage burial, must be regarded with suspicion, partly on account of the position of the burial and partly for typological reasons. The most puzzling of all is that from Bucheum 18, which was found by Dr. Frankfort. His note on it reads " found in front of the Painted Burial (Bucheum 18) under brick pavement." Now, the brick pavement was made to slide the lid on to the sarcophagus, and would also have been used to insert the mummy, unless this were done before the sarcophagus was in position. In the former event the eye must have been obtained from an earlier burial and thrown down while the workmen were preparing the pavement, in the latter the workmen must have robbed the new burial. Whichever hypothesis be preferred, such a state of affairs is difficult to credit, even in Egypt.

A few pots were found placed deliberately in the tombs, especially in the Baqaria, and these can safely be assumed to be contemporary in date with the burial. Others, as in Bucheum B, though inside the entrance, appeared to have been thrown into the tomb during some repairs.

A number of the most interesting objects, bronzes and others, were found without any specific provenance, thrown out in the ancient dump heaps of the Bucheum, or buried as rubbish under the floors of the superstructures. The two enemas and kindred objects had been thrown down a plunderer's hole in the north end of the Bucheum, apparently rejected by robbers as worthless when they were brought into the light. From internal evidence the original provenance of some of the above objects can be guessed without great difficulty.

To summarize the foregoing : The Bucheum was thoroughly ransacked from end to end by robbers on more than one occasion, and was also much disturbed during its occupation by collapses and repairs. Any argument from the positions of the objects is dangerous, on account of their frequent transposition during repairs, and this applies particularly to deductions from all those objects which were placed outside the entrances to tombs. Those found inside can be treated with less reserve.

From the various pieces of evidence a clear idea can be obtained of the appearance of the burial after it had been freshly made. The bull, or cow, was mummified, fastened to a wooden board by wrappings running through bronze clamps, and its head was supported by a large pillow under the neck and a small one under the chin. The head and neck were plastered and gilded, artificial eyes were attached, and a crown fastened between the horns. Sometimes pottery was placed in the tomb ; some containing water from the washings of the entrails of the cow, others possibly with offerings. The tomb was walled up and the stela was placed outside the walling on a stone slab. An offering table was also placed there, spout outwards. Round these were placed incense-burners, and pottery with other offerings. Lamps burned there, probably for the guidance of worshippers. A few votive offerings were made, in the form of sandstone tablets and inscribed pebbles, but these were left outside the Bucheum. There is no evidence whether or not the Bucheum was open to the public like the Serapeum, but if it were, the votive offerings would surely have been left outside the tombs.

Naturally the equipment varied. The Nekhthorheb bull had a finer funerary outfit than that described, one that was probably not much inferior to that of the bulls of Apis. In the Baqaria there were no sarcophagi after the first few burials, only occasional offering tables, and, as far as is known, but one inscribed stela.

O. H. M.

CHAPTER XIX

COMMENTARY ON THE OSTRAKA

THE great value of these ostraka as evidential documents is their lack of any bias. An official stela or account may always contain deliberate misrepresentations of fact, made with either a laudable or base intention, but ostraka are working accounts for the convenience of those who made them ; and, though they may contain slight falsifications of quantities, they are one of the most reliable forms of evidence for the events of their time.

Unfortunately the present series is lamentably incomplete in each section, and even the amphora covered with accounts, 0.30, is incomplete.

Ostraka available for comparison with the present series include : F. Preisigke and Spiegelberg, *Die Prinz Joachim Ostraka* (Greek and Demotic Ostraka of the Ibis and Falcon Mummies from Ombos). These dated from 79 B.C.—53 B.C. The following is an extract from a section dealing with these in *A Descriptive Report on Publications Dealing with Greek and Demotic Ostraka*, by G. Mattha (unpublished).

" The Demotic Ostraka . . . give the date of the burial ceremony of the sacred birds, the names and titles of the officials who participated in the ceremony and the names of some of the people of the locality who visited the burying places of the sacred birds, and left their names there recorded on potsherds for remembrance.

" Numbers 25 and 26 show that the embalming place had to be purified before the burial ceremony took place—a fact that is not recorded in the Greek ones."

The only examples in the present series which correspond with any of the above are the chert pebbles, inscribed with names, which were found above the north end of the Bucheum (0.100, 0.101, 0.102, 0.162, and 0.164–0.167). These are referred to again below.

U. Wilcken's *Urkunden der Ptolemaerzeit* was also referred to, but the bulk of the documents in that volume are concerned with persons and activities which had no parallel in the Bucheum.

CLASS I

The first, and probably the most important, group is that describing the contents of jars, and this is divided into three main categories with some miscellaneous examples at the end. The first category, in which there are fourteen examples with identical inscriptions (" Year 31, Paopi 10, Incense, myrrh (and) natron for the burial of Buchis.") is different from all the others. These ostraka must certainly belong to a consignment of materials for the mummification of Buchis, and it is very curious that though there were fragments of fourteen inscriptions for this one date, there is none for any of the other Ptolemaic burials. That so many should survive, smashed and scattered, from one date and not one from any of the other burials if they were also used therein, is against all the laws of probability. It may be argued that the

other consignments were not docketed ; but, even so, though I have no exact record I have a very strong impression that there were not enough sherds to represent such a quantity of pottery as would be required for ten or fifteen large jars for each Ptolemaic burial. In *The Apis Papyrus*, Pl. XV, col. b. (beginning) there is mention of ten jugs of natron apparently of 30 *hin* content, and on Pl. XVIII at the beginning there is mention of soaking a cloth in oil and natron (presumably mixed). Incense and myrrh are also mentioned and many kinds of oil. Whether the substances were sent up mixed or not is discussed below in connection with category II.

The date, year 31, might belong, according to Mattha, either to Ptolemy I Soter or Ptolemy II Philadelphus. Year 31 is the date already assumed, from the evidence of the other bulls, for the death of the second bull in the latter king's reign. These ostraka, then, fix the date of the burial as satisfactorily as a stela.

Of the second category (" The tomb of Buchis, Year 4, Mekheir 6, 10 talents of natron, myrrh, and incense.") there are only twelve examples. As Mattha has pointed out, there is an essential difference in the wording of the formula on these from that on the former category. These are for the tomb of Buchis, whereas the former were for the burial of Buchis. The evidence is not strong enough to connect the materials with the mummification of a bull, but points rather to the usual offerings. Again, the reason why there should be only two different consignments (for category III has a similar formula) is obscure. The addition to one of the jars (there is no evidence to show that any of the others carried it) of the formula " The 21 tombs . . . 9 oipe measures of salt," is strong evidence that this consignment was intended for the usual offerings, and not for mummification. Notice in this connection the " salt water pourer " in 0.30 (p. 164A accounts F.Q. & R.). Mattha points out that the palæographical evidence gives a date within the second century B.C. for this category. Assuming that twenty-one burials means eleven cows and ten bulls (for, if it meant twenty-one bull burials, this would conflict hopelessly with the palæographical evidence), the date must lie between 180 and 162 B.C., as can be seen from the chronological chart (Pls. CLXV and CLXXI). There are two years 4 in this period, year 4 of Ptolemy VI, 178–7, and year 4 of the co-regency of Ptolemy VII, 167–6. As there is no evidence for the use of the co-regency years of Ptolemy VII in this case, 178–7 has been taken as the date of this consignment, though 167–6 is equally possible.

There was a dried deposit on the interior of 0.121 and this was scraped off and has been analysed by Dr. Cox, whose report follows :

Report on Substance from Interior of Ostrakon 121
By H. E. Cox

" The specimen is a coarse powder, dull brown in colour when ground. It is partly soluble in alcohol, ether and petroleum, and gives the following figures :

Specific gravity	1.08
Ash	6.6%
Acid value	79
Saponification value	152

It contains 30 per cent of fatty and resinous acids, of which 12 per cent are oxidised acids.

On heating, the powder melts and burns with a smoky flame. There is no definite smell of incense, but a resinous smell in which I think myrrh can be discerned.

It is clear that no natron is present and that the powder is composed of very old resins and fats, the acids of which have become oxidised during the passage of time. I should think it had contained myrrh, but there is no evidence now of frankincense."

As far as can be judged, the vessels on which these formulæ are written were amphoræ, probably of type 88a. The base of a large handle was found half-way down the shoulder of one example, and the general shape agrees with this form. A rough calculation of the volume of 88d (Pl. CXLVII) was made, regarding it as a cylinder 24ins. high (excluding the neck) and 12ins. in diameter (say 61cm. — 30·5cm.), and showed the volume to be just under 50 litres. The jugs of natron mentioned in *The Apis Papyrus* would be much smaller than this, (probably) of 30 *hin* content. Petrie in *Weights and Measures*, p. 35, gives the *hin* as (29·0 c. in.) ·475±·005 litres.[1] Thirty *hin* would thus be about 14·2 litres. One of the jars, as mentioned above, was inscribed for 9 oipe-measures of salt in addition to the natron and other substances. One oipe-measure is 3·94 litres according to Wilcken (*Greek Ostraka* Vol. I, 750). The quantity of salt would thus be 35·46 litres. Though it is probably no more than a coincidence, 30 *hin* of natron and 9 oipe-measures of salt thus add up to 49·66 litres—a sum almost identical with the estimated content of one amphora.

But the weights of the myrrh, incense and natron are also given :—ten talents. As Dr. Cox's report proves that the substances were not mixed in the jars, myrrh only being present in the sample which he examined, it must be concluded that the formula on each pot referred to the whole consignment. The numbers on the pots, " First," " Second," etc., which only run up to " Fourth " may perhaps refer to the kind of substance included in the particular pot, e.g. : first for myrrh, second for incense, etc.

It remains to be decided if ten talents refers to the weight of the whole consignment or to that of each substance. A talent is 6,000 drachmæ, and a drachma is about 3·48 grammes.[2] This gives about 20·9 kilogrammes for the weight of a talent. The specific gravity of natron is 1·2–1·4, of myrrh 1·0–1·1, and of incense 0·95[3]. Thus the volume of a talent of each of the three substances is 16·1 litres, 19·9 litres, and 21·0 litres respectively. All these figures must be regarded with reserve owing to the impurity of the ancient substances, especially natron, but they may be taken as a rough guide. All the pots are not amphoræ, but it is best to take the above calculation of 50 litres as a general indication of volume. Twelve of these jars would have a total capacity of 600 litres, while 10 talents of each of the above substances make 570 litres, to which must be added the 35 litres of salt (9 oipe-measures), making 605 litres in all ; a remarkably close correspondence, considering the roughness of the calculation by which the capacity of the amphora was found. It seems safe, therefore, to assume that 10 talents of each substance were required, rather than 10 talents of all three.

The important difference between the inscriptions of the third and second categories is the absence of any mention of a tomb in the former (" Year 10, Mekheir 8, 15 talents of natron and incense "). Presumably, however, the consignment must have been for a ceremonial purpose in the Bucheum. The writing is dated by Mattha to the second half of the second

[1] A mean of the eight examples of the *hin* given by Mr. Sobhy in *J.E.A.* , Vol. X, p. 238ff., gives a value for the *hin* of .46±.005 litres, while Segrè in *Metrologia e Circolazione Monetaria degli Antichi*, pp. 17–18, states that it is ·485 litres.

[2] We are grateful to Mr. Mattingly for this information.

[3] Dr. Cox kindly supplied these figures.

century B.C. or the first half of the first century B.C. Giving this a liberal interpretation, there are three possible years 10 ; that of Ptolemy VIII Soter II, 108/7, of Ptolemy XI Auletes, 72/71, and of Kleopatra VI, 43/42. (Year 10 of Ptolemy VI is 172/171, but this is probably too close to group II for a palæographical difference to be noticeable, and may be disregarded.) Year 10 of Kleopatra is rather too close to the first Roman century to fit the palæographical evidence. This leaves years 72/71 and 108/107 as the most likely dates for this category. There is no method of deciding which of these dates is correct. Neither of them can possibly fit a burial. If these occasional offerings were to celebrate any event there may be a hint of the correct date in the fact that Soter fled from Egypt in 108/107.

Of the fragments, 0.97 gives year 4 of Caligula and to this date a burial is tentatively attributed, though it would belong to a very short-lived bull—less short, however, than one known in the reign of Antoninus Pius (Inscr. 17). 0.158, which joins 0.95 of the Greek ostraka, reads in both languages, " Year 23," " under the neck " and the number three ; in the Demotic, " 3 oipe-measures," and in the Greek " 3 water-pots." Mattha considers that it belongs to the first Roman century and the second bull of Tiberius has been dated to year 23 of that Emperor, A.D. 36, giving a length of life close to the average for the bulls of that period. " Under the neck " would seem to refer to the neck of a bull, and, owing to the walling of the tomb, it would not be possible to place anything there except during a burial. A " *tehm*-measure " of myrrh is also mentioned. In *The Apis Papyrus*, Pl. XIV, about the centre, are mentioned twenty *dny.t* that are laid under the *trf* of God, and at the beginning of the same plate are fifteen *wnḫ* dishes for the same purpose, " that nothing may fall there-from." There may possibly be some connection between these vessels and the one under discussion. " The sprinkler " in the Greek version may be the same person as " the salt-water pourer " of 0.30.

Class II

The hymn to Buchis is the only literary document from the Bucheum and is not without some merit as verse, though spoiled by conventional formulæ. Its particular interest lies in the fact that it is almost the only indication of the ordinary man's attitude to Buchis. The pebbles with names and the small sandstone stela show only that he worshipped the dead Buchis, but do not tell us whether such worship was spontaneous or official and perfunctory. In the hymn to Buchis a private individual is praying to Buchis to help him in some trouble. To discuss fully why the offering should be made at the Bucheum rather than to the living bull at Armant is beyond the scope of the present work ; but it may be suggested that the prayer was made at the time of the funeral of the bull, or perhaps during the hiatus between two bulls. The latter theory might be supported by the line " Has he his time of death when he will not hearken ? " But this is probably only a rhetorical question indicating that the god is never dead and will always listen to prayer. The free version of this hymn on pp. 15–16 contains certain divergences from the version in Vol. II, p. 66, that are unintentional and due to the fact that the translator found it essential to make some corrections in the text after the former version had gone to press.

There is an interesting comparison to this hymn provided in an article by Battiscombe Gunn, in *J.E.A.*, Vol. III, pp. 81–94, entitled " The Religion of the Poor in Ancient Egypt." The section of interest is the third stanza of a " Praisegiving to Amūn," by a draughtsman and

his son, which occurs on stela No. 23077 in Berlin. The date is Nineteenth Dynasty. Mr. Gunn's translation reads as follows :—

> " Thou art Amūn, the Lord of him that is silent :
> Who comest at the voice of the humble man.
> I call upon thee when I am in distress :
> And thou comest that thou mayest save me ;
> That thou mayest give breath to him that is wretched
> That thou mayest save me that am in bondage."

In this case the draughtsman and his son were praising Amūn in gratitude for the recovery from sickness of another son, whose illness had been brought on by the commission of some sin. Possibly the hymn to Buchis is of a similar nature.

Classes III and IV

The fragment of an oath, 0·118, and 0·172 are too damaged to provide any information of value. For similar documents see Sir Herbert Thompson, *Theban Ostraka*, pp. 57–60.

Class V

Second only in interest to the " Contents of Jars," are the " Accounts," and especially 0.30, which comprises the greater part of an amphora, on which were written four columns of spelt accounts for the month of Mekheir, belonging to the first Roman century.

In addition to the photographs, facsimile, transliteration, and translation, these accounts are tabulated on p. 164A. (Throughout this table S–g. stands for small-grained and L–g. for large-grained.) There are also a table of totals, a subject analysis and a separate table of the weaver's pay (pp. 163–164).

There is much information of potential value in these accounts, but it is not possible to make the fullest use of it here for two reasons : firstly, there is needed for a study of the material a specialised knowledge of temple practices, of accounts and of values at this period, to which the authors can make no claim, and, secondly, there are some doubts about the exact measure of corn referred to in the document. Mr. Mattha, very naturally, assumes an artaba ; but, even if this assumption be correct, we are still uncertain which artaba standard was used. There was a large number of these in use, with a wide variation of measure. Mr. Bell deals at some length with this problem in *P. London*, 1718 introduction, where he points out that in addition to the artabæ of 36, 40, 48 khoinikes and those larger, there is strong evidence to show that there were artabæ of 24 and possibly also of 20 and 16 khoinikes.

It might seem advisable not to attempt to interpret the results, owing to the present impossibility of calculating exactly the sums involved, but if our assumptions prove wrong, there would be no difficulty in arriving at the correct results from our figures by a very simple calculation. Moreover, some indication will have been given of the most helpful lines of research in relation to the problems of the Bucheum.

In the ensuing discussion, the smallest artaba whose existence is certainly known has

been adopted, since one of the features of these accounts is the large amounts involved. Throughout, therefore, an artaba of 24 khoinikes is assumed.

It is at once apparent that this is a series of accounts for different people kept by one man, but the capacity in which he was acting is uncertain.

It is possible that the scribe owned or was in charge of a granary, where the priests stored their private grain ; and that, as he doled it out, he kept notes of the objects for which it was drawn when asked by the owners. It is also possible that he paid bills for them to other people and that the entries " for the weaver," etc., are those in which the owner of the account did not draw the grain in person. The items " for my expense " in Premendēme's account (N) might be in the nature of a bank charge ; but, if so, it is strange that such an item does not occur in the largest account (A), that of Petosorbūkhe, son of Peftumont, the first priest. The banking system was well developed in Ptolemaic times.

It is more probable, however, that the author of the document was the scribe who kept the official account of the temple expenditure. In either case the figures would be approximately the same, as the priests' revenue was a calculated proportion of the total temple revenues and offerings (*P. Tebtunis* 302). Perquisites beyond this would consist of little more than bribes and gifts for special occasions,[1] and these, even if given in spelt, would hardly be paid into the granary. It is therefore possible to make some comparisons with other temples.

The first table for useful examinations is the " Totals Account " in which the details of expenditure have been omitted. Where is there no figure in Total I, the grand totals of each of the accounts, A, B, C, etc., include the actual sum of the figures at our disposal (hereinafter called the Sum) in place of the missing item. These Sums have also been included in the aggregate of Total I for all the accounts. Where the exact reading of a figure is doubtful an asterisk is shown, but, when such an asterisk occurs among figures which have been added up, in the course of the addition an o has been substituted if the doubtful digit is in the unit column and a ten if it is in the ten column.

The difficulty of interpreting these accounts lies in the meaning of the various Totals. Five different terms are used : " He took . . .", " He owns . . . ", " For Tobe " (or " Total for Tobe . . ."), " In his charge . . .", and " The surplus . . .". These are referred to throughout as Totals I, II, III, IV, and V. In addition to these, in some cases totals are given with no indication of the Total to which they belong, and these have been placed in one or other of the Totals, without there being much room for doubt about the accuracy of this placing. " The surplus " would appear to be " what he owns " (Total II). Matters are complicated, however, by the fact that, in M's account, " in his charge " is added to an item in Total II, and in S's account to an item in Total III.

It would be expected that " He took " would be the expenditure for the month. " For Tobe," either the expenditure for that month or the balance brought forward from it. " In his charge "[2] as Mattha points out, should be what is owing from him. " What he owns," might refer either to the state of his account at the beginning or the end of the month—or possibly even at the beginning of Tobe. An examination of the figures does not altogether

[1] Revillout, *Rev. Eg.*, 6, 127–128, Serapeum inscr. No. 24 gives details of a feast provided for the priests at the death of an Apis during the reign of Kleopatra the Great and her brother. As M. Revillout says " *Rien n'y manque* " in the list of provisions.

[2] Mr. Skeat tells me that there is an exact Greek parallel to this phrase :—ἐν ἀὐτῷ " owing from him."

elucidate matters. Even between the Sum and Total I there are discrepancies which cannot be accounted for by lacunæ. If " 1 spelt " and " 2 small-grained spelt " be added in the lacunæ of account A, on days 22 and 27 respectively, and if the " 90 (spelt flour ?) " be left out of consideration in account H, there are still only four accounts in which the Sum corresponds with the figure given in Total I, and only two others, B and I, where the figures are close enough for the difference to be accounted for by bad arithmetic. Nevertheless, in default of a better alternative, it seems best to accept Total I as representing the sum of expenditure for the month of Mekheir. In the same way the Tobe totals (Total III) are close enough to those for Mekheir (Total I) to be accepted as the expenditures in Tobe. These correlations can be accepted more readily since, if means be taken of the Sum and Total III in seven accounts, A, B, D, H, I, P, and S, and divided by thirty (the days of the month), the result is a round number of artabæ per day, or one with a reasonable fraction, *viz.*, 5 (for the first priest), $1\frac{2}{3}$, $1\frac{1}{3}$, 1, 1, 1, $1\frac{1}{3}$, respectively. The priests' incomes are discussed below.

The real difficulty is encountered in connection with Totals II and IV. If II represents a credit balance at the end of the month and IV a debit balance, then the two items would not occur in the same account, which they do in several cases. The most reasonable assumption that II is the credit balance at the beginning of the month and IV the debit at the end, is supported by account P, where the totals balance correctly according to this assumption. R is also nearly correct on the same assumption, and if 3 be read for the missing digit in Total IV of account H a correct result is again obtained. In no other case is this achieved, but as no other theory is supported by any of the accounts, it seems best to accept that which has some relation to some of the figures. The variation of daily total payments is irregular and seems to have no particular significance (except in one connection that will be quoted in the subject analysis). Three days have only single figures and at first it seemed possible that they might be " unlucky days," but comparison with the table of three magical papyri, published by Mr. W. R. Dawson in *J.E.A.*, Vol. XII, p. 260ff, and Pl. XLV, shows that there is no evidence in favour of this.

An analysis is given of the more important objects of expenditure, but these do not fall into any regular groups that might indicate a festival of any sort. It has to be considered whether these are ordinary monthly accounts or whether they represent a special occasion, such as the burial of a Buchis bull.[1] On account of the nature of one or two of the more striking items, the latter might at first seem likely, but a closer analysis of the accounts yields no strong reason for holding this hypothesis. Most of the items are evidently daily drawings of corn by the priests for their own purposes. The occasional entries connected with official matters are easily accounted for by the routine of the temple worship, the only large item being that of 180 spelt on the 2nd of the month (the item of 90 in account U may not belong exactly to this date, and that in account H is not added into Total I and may have been inserted in error). It should also be noticed that account U is obscure at the beginning and it is possible that it is not an official account, but a private one, in which mention of the Pastophoroi of the temple of the Osiris Buchis occurs, but the marked difference from the other accounts seems to justify describing it as the former. Two papyri in Wilcken, *U.P.Z.* contain references to the Pastophoroi of the Serapeum : 99 l.8–10 (158 B.C.) " For the Procession of the Pastophoroi, 40 Dr." ; 101,

[1] See p. 157.

(156 B.C.) " The account of Patōs the Pastophorus about what he owes me from the temple from 1st of Pachons to 30th Mesore.

Lampwicks	600 Dr.
Frankincense	560 ,,
for wood	60 ,,
for me	400 ,,
concerning Aonchis	200 ,,
Parmuti water	225 ,,
for dried figs	150 ,,

" Making till the 30th Mesore 2192. On the 1st Payni he has received back from me in copper money Dr. 1,000, Interest 50." See also the Pastophoroi in *Dem. Pap. Cairo*, 31080, quoted below on p. 161.

The item " for a sailor " has, presumably, a riverain rather than a nautical significance. The Greek ναυτής " sailor " refers to one of the crew of a Nile or canal boat. The mention of the salt water pourer is interesting in relation to the consignment of 9 oipes of salt for the twenty-one burials which is mentioned among the contents of jars.

The two most interesting accounts in the analysis are that dealing with spelt for making flour, and that for the dancer and the dancing musicians. With regard to the former, it will be seen that the largest quantities are drawn on the 6th, 7th, 8th ; 18th, 19th, 20th ; and 28th, 29th days of the month. Allowing for the time taken to grind the corn, it is a plausible explanation that it was customary to bake bread at the beginning of each ten day period. Alternatively this may give an indication of the local market days.

The account of the dancer and the dancing musicians is very tantalising, for with a little more information the most interesting results might be obtained, but it is just that little information which is lacking. It is true that none of the references to these employees is fragmentary, but there is nothing to indicate whether they paid daily visits or were present from the 8th to the 23rd. The item on the 8th is entitled " the dancer," and on the 18th, " the singers of the temple,"[1] so these two items may not refer to the same troupe. In *J.E.A.*, Vol. X, p. 134ff, Prof. W. L. Westermann, in an extremely interesting discussion on the payment of these troupes, gives a table of the payments at various dates, but these payments were partly in money and partly in kind,[2] whereas there are no money items in the Bucheum account. Another point of differentiation between these accounts and those quoted by Prof. Westermann is that whereas his accounts are with secular troupes, performers in the Bucheum account appear to be attached to a temple, or to the worship of Amūn.

With all these differences, it does not seem worth while to attempt to convert from artabæ of spelt into money—always a difficult matter.

See also the harp-player and the public singer in the account of the House of Mont quoted below, p. 161.

[1] See Prof. Otto's supplement to Spiegelberg, *Demotic Loeb Papyrus*, p. 107.

[2] Prof. Westermann does not mention the interesting fact that at the present day the hirer of a dancer and troupe of musicians is expected to supply transport to and fro, beer and food, as well as payment. He says that it is not proved by any means that dancing and musical entertainments ceased (after the end of the third century). Surely it is certain that the present troupes *are* in direct traditional descent from those with whom his contracts are concerned. The effeminate male dancer was known in the last century.

A separate account has been made out for the weaver as he is mentioned so frequently. There are also mentioned a Greek weaver and the weaver of Royal linen. This last item is of exceptional interest on account of Mr. Midgley's discovery that the textiles used for mummification at the Bucheum are identical, in many ways, with prehistoric fabrics. The evidence seems to point to a special craft carrying on the old weaves for ceremonial purposes. (See p. 62.) In *The Apis Papyrus* a number of different kinds of linen are mentioned, and it is possible that it was for one of these that the Greek weaver was required. But if this is so the view must be accepted either that linen was kept ready for a burial, or that a burial was in progress, for which there is no other evidence. There is no death of a bull known in Mekheir or Phamenoth during the first Roman century, though such may have occurred. For Apis and Mnevis the linen for mummification was supplied by different temples. For an example of the latter case see *P. Tebtunis* 313, which is a receipt for twenty, or twenty-odd, cubits of fine linen sent from Tebtunis to Heliopolis for the funeral of Mnevis.

The weaver's pay works out at $1\frac{2}{3}$ artabæ a day, or more.[1] Westermann (*op. cit.*) quotes a first century Latin document which gives the pay of a weaver at $5\frac{1}{4}$ obols a day, and a master weaver at $1\frac{1}{2}$ drachmæ. Angelo Segrè in *Rassegna Numismatica* XIII (1916) *Circolazione Monetaria e prezzi nel Mondo Antico ed in particolare in Egitto*, gives no figures for the price of spelt in the first Roman century, but corn, during the month of Tobe, is given as 10 and 11 drachmæ the artaba. Fr. Heichelheim in *Wirtschaftliche Schwankungen* quotes wheat at $3\frac{2}{6}$ silver drachmæ and 2 silver drachmæ in 18 B.C. and 5 B.C. respectively. The size of the artaba is not specified, but one of 36 khoinikes seems to be generally assumed at this date. The ratio value of wheat to spelt at 120 B.C. is given by Messrs. Grenfell and Hunt as 5/2 (*P. Tebtunis*, Vol. I, p. 560). This gives a figure of $5\frac{1}{3}$ obols as the price of an artaba (of 24 khoinikes) of spelt. This would bring the weaver's pay at the Bucheum to just over $1\frac{1}{2}$ drachmæ a day—a figure which corresponds so closely with that quoted by Westermann that it goes a long way towards justifying the assumption of an artaba of 24 khoinikes.

Returning to the totals table, the actual sum of the daily figures given is $1{,}043\frac{1}{3}$ artabæ ; that of Total I, substituting the Sum where there is a lacuna or no figure is given for " what he took," $1{,}061\frac{1}{3}$; that of Tobe, substituting the figure from Total I where there is no figure, or, failing that, the Sum, $1{,}031\frac{1}{2}$. The fairest way of arriving at the total monthly expenditure seems to be by taking the arithmetical mean of these figures, which is 1045 artabæ. (There is so much substitution that it is hardly worth taking a weighted mean, and, anyway, the probable error on the above figure is only ± 5.) Allowing a sixth of a month's revenue for the five epagomenal days, this makes a year's expenditure of 12,715 artabæ. This includes the $90\frac{1}{3}$ artabæ for Buchis in account U, which might not recur each month, and also, each quarter, that in H's account, though it is not given in Total I and may have been written in the wrong column originally. In *P. Tebtunis II*, p. 64, the net revenue of the temple of Tebtunis is estimated at 330 artabæ of wheat. For purposes of comparison the Bucheum figure must be converted to the

[1] Roughly speaking, this is equivalent to $30\frac{1}{2}$ bushels of spelt a month, or (in value) 12 bushels of wheat. In *English Men and Manners in the XVIIIth Century*, Turbeville shows that in 1816 a weaver's total wages worked out at 6s. $4\frac{3}{4}$d. a week. He also gives a table for the legal price of bread in relation to the price of wheat (including baking) at that date. The average figure was 8s. 2d. a bushel. Thus the weaver's wages were not worth so much as four bushels of wheat a month. He did not have to provide his own yarn, but he had to provide everything else, and the difference in real wage is astonishing, especially considering the small requirements in Egypt for clothing, firing, footwear, etc.

larger artaba of 36 khoinikes and into wheat values by the 2/5 ratio given in (*op. cit.*) p. 560. This reduces the figure to 3,390, or over 10 times that of the Tebtunis temple revenue.[1] Mr. T. C. Skeat says in a letter : " Olyra (spelt) is very rare in the Roman period, being only twice mentioned in documents after the beginning of the Christian era, and only occasionally in the 1st century B.C. (Schnabel, *Die Landwirtschaft im hellenistischen Aegypten*, pp. 94–100). Any large-scale production of spelt in the 1st century A.D. is therefore very interesting, if the date is reliable."

It may be that the value of spelt had declined by the first Roman century, and that for this reason the Bucheum figures are lower than they appear, but it is probable that there were money payments in addition to those of spelt, for high figures of silver money were also being accounted (in 0.96 and 0.103 discussed below).

It is not to be expected that all temple revenues should be the same, and these figures would not be surprising if better and more superstructures had been found at the Bucheum, but the remains of those found were totally inadequate for the official and private needs of priests of the wealth indicated. Possibly the priests would not live within the Temenos area even where the sacred buildings were all underground, but in that case it would be expected that they would live near by, and there were no signs of suitable buildings. It is possible that these accounts referred to the Cæsareum (the Temple of Armant), and there is evidence to support this theory. Account I, day 18, there is a payment " by the Pastophorus of the Cæsareum." There are several payments for the sanctuary. In account U there is a payment for the courtyard and another for the temples. All these seem to refer to buildings in the town of Armant rather than to anything at the Bucheum. More significant is the payment for " the fodderers " in account A, day 24. If the accounts were for the temple at Armant, a larger account than that at Tebtunis, or one as large, would be quite natural and the item of 90⅓ " for the god " might be the food of the living Buchis, though admittedly Osiris Buchis is specified. Mr. Holmes of the Royal Veterinary College has kindly supplied some figures of the consumption of corn by bulls. He is of the opinion that a bull doing no work, and fed with a plentiful supply of greenstuff, would not require more than 10 lbs. of corn a day. Spelt, being a poor quality grain, would probably weigh about 40 lbs. to the bushel, so at this rate the bull would not require more than about 7½ bushels a month for actual feeding. The artaba of 24 khoinikes of ·98 litres is 23·5 litres, or ·65 bushels, so 90⅓ artabæ, 58½ bushels (about), would be nearly an eight months' food supply for Buchis, or four months for Buchis and his mother, which seems rather much to be drawn out at one time. It does not seem probable that an official would draw out a quantity of spelt for a ceremonial offering to the god, only to be redistributed to the priests, so this item remains obscure. It should also be mentioned that Buchis was peripatetic, and probably spent about ten days in each temple when there was no disturbance to upset the regular routine.

A mention of " solid offerings " occurs in *Theban Ostraka*, pp. 51–56. In transfers of temple services, the lessee receives among other things the solid offerings. Sir H. Thompson says about this : " *fy* is that which is brought, any offering. It seems likely, however, that the

[1] Prof. Otto points out that the Tebtunis temple was obviously a small one (*letter to the author*), but, seeing that the crocodile lived near the temple in addition to being buried there, the establishment should surely be larger than that of the Bucheum. See also the reports in the Press of the discoveries of the *Reale Missione Archæologica Italiana in Egitto* at that site.

temple offerings were largely a matter of contract, or at any rate not wholly voluntary ; and when in the shape of food they became the perquisites of the priests. Perhaps *fy* was largely bread." In the present context, however, there can be little doubt that our items are what the priests are giving, not receiving.

According to the latest discussion by Wilcken, *U.P.Z.*, pp. 288–295, the twins appear to have received 12 artabæ of wheat per month. This is equivalent to 45 of the small artabæ of spelt. A small sum compared with the payments in the Bucheum account.

The total expenditure at the Bucheum is equal to about 8,224 bushels per year. In modern Egypt the yield for wheat is 5–7 ardabs a feddan. Taking the lowest figure, this is 25 bushels an acre. Therefore, 529 acres or about 488 arouræ in all were needed to supply the spelt in the above account, assuming a yield spelt similar to that of wheat.[1] The temple of Tebtunis (*P. Tebtunis* 302) owned 500¼ arouræ, but it is not possible to establish an exact connection at that place between the land and the revenue, as the latter is given in artabæ of wheat and lentils, and in drachmæ. Moreover the temple would not receive in its net revenue the full produce of the land, as there were the cultivators to be paid. It is not suggested that the Armant temple owned this amount of land, but that wealth equivalent to the produce of a medium-sized farm was required for its upkeep.

So far, accepting the volume of the artaba as 24 khoinikes, there is reasonable agreement between the pay of the weaver at Armant and a weaver's wages as known from other sources. With the other individual payments more difficulty arises. The incompleteness of the account becomes a more serious matter, and the absence of any titles of the owners of the accounts (except A, " Petosorbūkhe, the first priest," and B, " Peftumont the priest ") is a hindrance.

Grenfell and Hunt (*P. Tebtunis II*, p. 64) give the share of the high priest (" chief prophet ") as one fifth of the total net revenue. In Hastings' *Encyclopædia of Religion and Ethics*, Vol. X, Article on " Priesthood," Blackman gives the following facts : At the temple of Amūn at Teuzoi the revenue from the temple lands was divided into a hundred equal parts. A fifth of this went to the chief priest and one share each to the eighty priests who served under him. These were apparently paid yearly. Offerings for priests of Anubis at Lahun were divided daily, proportionately according to their status, hence the chief priest of Hathor at Reonet (Tehneh) received a tenth of " all that enters the temple." In addition to the biggest annual stipend and daily rations, the high priest had special perquisites. For example, at Assiut the superintendent of the priests was entitled to a roast of meat for every bull slaughtered in the temple, and a proportion of beer for every vessel of beer offered on a day of procession. An allotment was due to the daughters of priests from their birth, and the wives of priests also received an allowance of bread. Otto, *Priester und Tempel*, Vol. II, p. 35, shows that the daughters of the Phyle priests were priestesses from birth and were paid from then, but the sons only became priests at the will of the king.

The above family allowances explain the entries " for his wife " and " for his daughter." Sums so entered would not be deducted from the drawer's own credit, but would be debited separately against his wife or daughter, as the case might be, from their allowance.

[1] Revillout in *Revue Arch.*, Vol. II, p. 153, assumes a yield of 10 artabæ of spelt per aroura, but the artaba is not noted. *P. Meyer*, 0.59, A.D. 70. The lease for an aroura was $4\frac{7}{12}$ artabæ of wheat and the tax $\frac{7}{12}$ of an artaba.

An interesting table of the proportions of priests' pay at a temple of Sebek at Lahun is given by Borchardt in *A.Z.*, Vol. XL, pp. 113–117. "Besoldungsverthaltnisse von Priestern im Mittlern Reich."[1] The pay was received in "Pieces of Bread," "*Sḫ*-jugs of Beer" and "*Ḥpnw*-jugs." The income of the temple is also given, but though no useful comparison can be made either with the actual amounts received or the substances, the proportions allotted to the priests might be expected to remain fairly constant. In the following table the first three columns are copied from Borchardt and the remaining two have been calculated from his data. The annual percentage differs from the monthly because, according to Borchardt's deductions, the priests of the Phylai were only paid during their three months' term of office. Apparently the four Phylai took a month's duty each three times a year. (M) stands for "who is in his month." The officers have been given letters in the left-hand margin for comparison with the Bucheum table.

The Allotment of the Remainder of the Income after the Share of the Ka Priests had been Deducted

	Official title	*No. of Officers*	*Share each*	*Total Share*	*Total Monthly percentage*	*Total Annual percentage (Circa)*
A.	The Baron and Overseer of the Temple	1	10	10	24·0	40·0
B.	The Chief of the Phyle (M)	1	3	3	7·2	3·0
C.	The Chief Lector Priest	1	6	6	14·4	24·6
D.	The Temple Scribe (M)	1	1⅓	1⅓	3·2	1·3
E.	The Lector Priest	1	4	4	9·6	4·0
F.	The *Wtw* Priest (M)	1	2	2	4·8	2·0
G.	The *Ỉmi*-st-Priest (M)	1	2	2	4·8	2·0
H–J	The *Ỉbḥ* Priest (M)	3	2	6	14·4	6·0
K–L	The Royal Priest (M)	2	2	4	9·6	4·0
M.	The *Md W*——	1	1	1	2·4	4·0
N–Q	The Doorkeeper	4	⅓	1⅓	3·2	5·3
R–S	The Nightwatchman	2	⅓	⅔	1·6	2·6
T.	The Temple workman	1	⅓	⅓	·8	1·3
		20	—	41⅔	100.0	100.3

The share of the Ka priests is of no value for comparison with these calculations, since there was none at the Bucheum.

From the resultant percentages it looks very much as if the assumption that the Phyle priests were not paid except when on duty is unjustified, unless they were paid for work at another temple or elsewhere. If Borchardt is right, the chief of the Phyle would receive less than the doorkeeper.

There are here twenty individuals and in the Bucheum accounts there are twenty individuals and an odd account, apparently of an official nature, possibly for the Pastophoroi, There is also a fragment of an account for Phamenoth (0.23) and the only priest mentioned in this who may possibly be identifiable in the account for Mekheir is "Peftumont the younger"

[1] I am indebted to Fairman for assistance in interpreting this document.

(F or I), and he, by comparison with the above list, should be a Phyle priest, and so not present in successive months. Again, in the Mekheir account all the priests, except four, have accounts for Tobe, and the absence of even these four may be due to faulty text. It is, in fact, impossible to establish from the material at our disposal whether the priests are in the same order in the Armant account as in the above list, but, if they are, all the percentages of the revenue drawn by each person changed greatly between the Middle Kingdom and the Græco-Roman period, or varied much with the source of income, for the mean monthly percentages of those at the Bucheum which show a close correspondence between the figures for Mekheir and Tobe are as follows: (To the nearest tenth per cent.) A—14·1, D—3·8, G—6·1, I—2·7, P—2.8, S—2·2. There is nothing in these figures upon which any conclusions can be based except that the number of personal accounts being the same in both cases, it is probable that all the persons in the Bucheum account were members of the temple staff.[1]

To sum up. There is not sufficient evidence to state definitely the meaning of these accounts, but the available evidence interlocks sufficiently for it to be possible to put forward the following explanations until further evidence be forthcoming.

The accounts are in artabæ of spelt, each artaba consisting of 24 khoinikes and are those of twenty priests and officials of the Bucheum or the Armant temple, probably the latter. There is added an official account of some sort.

They represent the division of the temple revenues, or part of the temple revenues, among these officials for the month of Mekheir during the first Roman century, with their total receipts for the preceding month inserted among the totals. The officials had allowances for their wives and daughters and they were allowed credit.

Finally, a little under 500 arouræ all told were needed to support them; a state of affairs closely paralleled by the large proportion of the revenues of modern Egypt employed in supporting a vast bureaucracy.

Dem. Pap. 31080 (Ptol.) is of considerable interest for comparison with the account from the Bucheum. Parts of the document are translated, but not transliterated, by Spiegelberg in *Cairo Catalogue*, 1908. Of these one or two sections are sufficiently relevant to quote here:

Col. 3, l., 6, *Tatermuthes, die Frau der Bank für die 9 Monate 2 hin.* Spiegelberg gives a footnote to *die Frau der Bank : Das ist die in den demotischen Verträgen so oft erwähnte Tempelkasse von Hermonthis*, but unfortunately he does not say where these accounts are to be found.

Col. 4.

2. *Die Rechnung der Beiträge fur das Haus des Mont, Herrn von Tȝ-tn* (*To-tun*) *vom 1 Thot.*

3. *bis zum 10 Tybi = 130 Tage* .. ..

4. *Die Aufstellung? (smn)* .. ..
   Die Priester, welche eintreten .. .. 6 *Artaben*
   Die Pastophoren .. .. 3 ,,

5. *Der* kut-*Priester* .. .. 3 ,,
   Der Harfenspieler (pȝ ḥs binst (ϭοιπι) .. .. 2 ,,

[1] Professor Otto doubts the validity of these comparisons on account of the great difference in period, and this certainly makes the comparisons less useful than they might be, but scarcity of detailed accounts forces us back upon this example.

6. *Der öffentliche (?) Sänger* (p? ḥs nt wn.ḥr) .. .. 1? *Artabe*
   Der .....? .. .. ½ „
7. *Der Träger (?) der Milchkanne* (mhn) .. .. ½ „
   Der . . ? . . .. ½ „
8. *Haroeris* .. .. ½ „

17 *Artaben auf* 130 *Tage*

9. *macht* 2210 *Artaben, je* 98 *Artaben auf* 1 *Keramion, macht* $22\frac{1}{2}\frac{1}{12}$ *Keramien.*
10. *Andere Rechnung für Pikos, Sohn des P*? . . .-Sbk, *vom* 11. *Pachons*
11. *bis zum letzten Payni* = 50 *Tage. Die Abgabe? der Pastophoren* 1 *Artabe*
12. . . . 16 *Artaben taglich, macht* 800 *Artaben* = ... *?* .. .. —
13. *Ferner (?) vom* 1. *Phamenoth bis zum letzten Pachons* .... = 3 *Monate*
14. *Die Abgabe? des Harfenspielers* 1 *Artabe* .. .. 15 *Artaben*
15. *auf* 3 *Monate, macht* 1350? *Artaben* = ... *?* .. ..
16. *Die Fest-Artaben der Priester :*
    Pbekis, sohn des . . ? .. .. 151 *Artaben*
17. *Dji-Ḥar-p-to* .. .. 6 „
    Peteminis (?), Sohn des Sminis (?), (18) *für den* 10. *Tybi* .. .. 20 „
    nach Koptos .. .. 6 „
19. *Die Garten des Gärtners der Insel* .. .. 6 „
20. *Die Vorsteher* (rmt nt šn) . . . *?* .. .. 9 „

198 *Artaben* = 2 *Keramien* + ...*?*

The rest contains nothing relevant to the present purpose.

The place referred to here is hardly likely to be the temple of Armant itself. Spiegelberg says about it: "*Diese Ortschaft, welche so häufig in Verbindung mit dem Gotte Mont erwähnt wird, ist genau so geschrieben wie* ⲧⲟⲧⲉⲩⲛⲓ = *Tebtynis. Es kann sich nur um eine auf thebanischem Gebiet gelegene Ortschaft handeln.*" Line 4. "The priests who enter." Mattha sent a note too late for insertion in Vol. II, that o. 165, l. 3, "The fresh priests" is literally "The priests who enter, *n w'b-w nt 'ḳ.*" It is a pity that in the papyrus the exact numbers of the officials of whom there are more than one (e.g., the fresh priests and the Pastophoroi) are not given, because it is stated that the amounts are daily and a very fair comparison could have been made. Line 5, "The harp-player" with 2 artabæ a day can be compared with several of the average amounts in o.30, e.g. account T. Line 6, "The public singer," may well be such a person as Prof. Westermann refers to in his article, quoted on p. 156, rather than "The singers of the Temple," found in o.30, account U. Line 7, "The carrier of the milk jugs," can hardly have any connection with Buchis unless for the feeding of a young bull, though this would surely have been done by the bull's mother. Line 16, Pbekis draws a large amount, more than Petosorbūkhe (account A) drew in a month, but the period over which Pbekis drew it is not known. Line 19, "The garden of the gardener of the island." Possibly the island of *P. Lond*, p. 610, see below, p. 168.

Theban Ostraka, pp. 39–41, concern deliveries of wheat for the priests and the temple of Mentu, but they are not sufficiently detailed to assist in the elucidation of the Bucheum ostraka.

TOTALS ACCOUNT

DAY	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	TOTALS	DAY
1	9½	11	2+	2+	2+		1½		2		?	1+						3	1	2	2½	39½+	1
2	4		2½					90+	2											6	90⅛	194⅚	2
3	7		*		13½+			2	2											1		27½+	3
4	4	6					3	1	1										2	*	*	17+	4
5	4		2+				4	3												3	6	31+	5
6	9																			2	*	22½+	6
7	4	3			12⅜				2			2½								2	*	27+	7
8	4	3			*4							*								2	*	45+	8
9	5		3+			6					3+								3	2	3	19+	9
10	4	3				1			1							1½	1+			2	*	26½+	10
11	7		8			*		3					1				1			2	*	28+	11
12	4							2												2	*	22½+	12
13	4																		3	2	*	9+	13
14	4	11			1			3						3				9		2	*	35+	14
15	4	3			17+			2						*				1+		2	*	28+	15
16	4	8						1						1						2	*	36+	16
17	4			2½		2	3	3			1½						3	2½	2½	2	*	37½+	17
18	5	3		3		2½	3	2½	2		2+		4+	7			3	4	2½	2	*	43⅜+	18
19	5	3	11			6½+	3	2½	2					1½			3	3½	2½	2	*	41+	19
20	4	13			1+		3	2½	2					3				2½	1	2	*	21+	20
21	4½	3												3				3		2	*	11+	21
22	4½													3							*	21+	22
23	11	5+				2½	3				2½			3					3		*	18⅝	23
24	2				5	2½	3							10							*	11	24
25						2½*															*	5	25
26																					*	12	26
27	2													3							*	18½+	27
28	5					3+	3	2½	3		2			29	2						*	44½+	28
29	8	3½	3		5		6	3	5					40⅛		28	18	5	3	1	1	55	29
30 'Plus'	*				1		3	5	4													86½	'Plus'
Sum	135½	87½	31½	7½	72+	26+	35½	26	28		11+	3½+	5+	161+	22+	29½	35+	40½+	22½	45+	118⅝+	1043⅛+	
I 138½	81		39		106		3	23	29		38		29	61	2	10		39	23⅛	8	6	530⅛+	
II 80	111																						
III 158	21		40		18*		63½	22	29?		*		29	76	*	29½	46	*9	28	*	—	741+(1031½+)	
IV 2					18		41	1*							*	19½	28½	2		61	—	182+	
V			141						*												—	141	

Subject Analysis

Day	*For making flour*	*Dancer and dancing musicians*	*Pastophoroi*	*Solid offerings*	*Sanctuary*	*Osorbūkhe and the god*	*Saltwater pourer*	*Total for sacred purposes*	*Day*
1	2½					8		8	1
2						180⅓		180⅓	2
3	4+		2		1			3	3
4					2			2	4
5									5
6	7½								6
7	3½						*	*	7
8	2½	1 (D)						1	8
9				6				6	9
10		6	*					6+	10
11		3					1	4	11
12									12
13	2								13
14									14
15					*			*	15
16				12			*	12+	16
17									17
18	15½	6	2					8	18
19	8½								19
20	6			20				20	20
21			*	6				6+	21
22									22
23		4						4	23
24	3								24
25									25
26									26
27									27
28	8+								28
29	9½								29
30					2			2	30
'Plus'				40½				40½	'Plus'
	72½+	20	4+	84½	5+	188⅓	1+	302⅝	

The Weaver's Account

Day	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	Total	Day
1		1			2																	3	1
2																				2		2	2
3			*																				3
4																						*	4
5		1						3														4	5
6																							6
7																							7
8					1				2													3	8
9	1										*											1+	9
10																							10
11	4	7																				11	11
12			1																			1	12
13																							13
14																							14
15																							15
16					2																	2	16
17																							17
18																							18
19	1			1							*											2+	19
20													1					2				3	20
21																							21
22																							22
23		1													2							3	23
24																							24
25																							25
26																							26
27														3								3	27
28																							28
29	2	1					3		2													8	29
30								2	1								1	2				6	30
	8	11	1+	1	5		3	5	5		*		1	3	2		1	4		2		52+	

Day	A Petosorbûkhe, son of Peftumont, the first priest	B Peftumont, son of Theteu, the priest	C ? [son of] ?	D Peftumont, son of the same	E Peftumont, son of P . . . wr	F Peftumont the younger, son of Petecharûsiri	G Pshenosorbûkhe, son of *P-ast* the elder	H Petosorbûkhe, son of Pshen . . . wr	I Peftumont the younger, son of Ûennofre	J ? [s. of] ?	Day	K Peftumont, the elder son of the same	L ? [son of] ?	M Peftumont the elder, son of Ûennofre	N Premendēme	O Peftumont the younger	P Peftumont the elder, son of the same	Q ? [son of] ?	R ? [son of] ?	S ? [son of] ?	T Petosorbûkhe the elder	U ? the Pastophoroi of the Temple of Osorbûkhe	Day
1	4 for his house 1½ Pshenubast for his sister 4 the son of Petosorbûkhe the elder	8 for the god 2 L-g.[2] his son 1 the weaver	[2 flour * to the provision store 2½	* ? 2 S-g.	2 the weaver		1½ for making flour		2 L-g.		1	*	*					3	1 for making flour	2	2½ wheat Second Phyle 90½ Osorbûkhe the expense	1
2	4										2		1							4	* S-g.	2
3	4 3 the son of Petosorbûkhe		[* again the weaver		2 his son for making flour 6 again his wife * his son for making flour ½ his wife			90 Spelt flour ? 2 for the pastophorus	2 flour 2		3							1	1 to the sanctuary	2 again the weaver	6 by Piko * L-g for . . . . . * Psensnau, son of the same 3 S-g.	3
4	4		* S-g.]		2 his son for making flour 3 S-g. Tikhnum		3 S-g.	1 for the sanctuary	1 the sanctuary		4	1					1	1 *hata*	1	*	* for the writing S-g.	4
5	4	1 4 S-g.[1] 1 the weaver	2 * S-g. * to the provision store				4	3 the weaver			5	3 S-g. 1 2 in the evening							1 for spelt flour	3	4 flour for the temples * the courtyard	5
6	4 . . . . . 5 for his wife										6	4½ for making flour 3 for the expense	3 for making flour * the priests								6
7	4				6 3 his wife						7	4½				* the saltwater pourer					7
8	4	2 1 for the dancer			3½ for making flour *3 S-g. [a total]				2 the weaver		8	3½	2½ for flour					5	1	2		8
9	4 1 the weaver		3 L-g. * S-g.		1 the weaver						9	2 for my [?] expense 1										9
10	4	3 flour for the dancing musicians				3 for the dancing musicians of Amûn					10	3	* S-g.		2 L-g. for the sanctuary		1½ [date unknown]	*		2		10
11	4 4 the weaver 3 flour for the dancing musicians	7 the weaver				1 the saltwater pourer			1		11	* for the weaver * for the pastophorus of . .						1 1		2		11
12	4		1 for Hor the weaver 2 for a scribe 5			* ?		3 by Peftumont the younger			12	1		1 L-g.	1 S-g.					2 *		12
13	4										13									*		13
14	4	8 S-g. 3 ,, for his son						2 for making flour			14	3 S-g. 2*								*		14
15	4	3			1 the son of Petosorbûkhe			3 S-g. Penoh	2 S-g.		15	1						5 for himself 4 S-g.		2	* Peftumont	15
16	4	8 S-g. for his daughter			* S-g. his sister 3 ,, 1 the weaver 1 for him 12 in the evening towards the solid offerings			1 for him also			16							1 * the saltwater pourer		2	3 S-g. for a sailor [?]	16
17	4										17									2		17
18	4 1 for the burial of Pshen-Amûn the younger	1 his son 2 S-g. for him himself		2½ for making flour		2 for making flour	3 for making flour	3 S-g. for Penoh 2½ for making flour	2 by the Pastophorus of the Cæsareum		18	1½					3 for making flour	2½ for making flour	2½	2	6 the singers of the temple	18
19	4 1 the weaver	3 S-g.	5	2		2½	3 for making flour	2½ for making flour			19	2 * the weaver					3 for making flour	4 his wife	2½	2	*	19
20	4	2 4 S-g. for him himself 1 L-g. his son * towards the solid offerings 6 for flour	6	1 the weaver		2½ 4 L-g. again Peshor on account of ?	3	2½	2 L-g.		20			* L-g. 3 1 for the weaver *				2 the weaver 1½	2½	*	* for a smith	20
21	1½ (?) 3 S-g. Pshenamûn	3 S-g.			* ? 1 . . . . . * the pastophoroi						21	1 L-g. 6 for the solid offerings						2½	1	2		21
22	[1] 4 the . . . [Ionan] ? weaver ½ S-g.										22	1½						3		2		22
23	4 2 for him himself 4 the dancing musicians 1 flour	1 3 S-g. 1 for the weaver *									23	3 S-g.	* ? 2 for the weaver									23
24 25 26	2 the fodderers				5 his wife [date uncertain]	2½ 2½ *	3 for making flour				24 25 26	3 S-g. 3 ,, 3 ,,	2½						3			24 25 26
27	[2 S-g.]										27	3 for the weaver								2		27
28	2 spelt flour	5 for making flour				* for making flour	3 for making flour	2½	3		28	10 ,,								*		28
29	1 for making flour 3 S-g. Petosorbûkhe 2	2½ for making flour 1 the weaver * ,, ,,	3 for making flour		5	3	3 for making flour 3 S-g. the weaver	3	3 2 the weaver		29	3 S-g.	2 S-g.			3			2	1	29
30	2 the weaver				1 for the sanctuary		3	3 2 the weaver	3 1 for the weaver	Pshen-ʿapaḥti	30	3 S-g. 1 for the sanctuary 25 a total of[1] 40½ towards the solid offerings[1]					3 1 the weaver	3 2 the weaver	3	1		30
"Plus"	* the weaver of the Royal linen																18					"Plus"
I	*He took* 130 8½ S-g.	81 S-g. (*N.B.*, No " he took " precedes these figures)	[31½]	20 (*N.B.*, See note in A/c B)	[56+] [16+] S-g.	33 55	28½ [*sic*] 35	36	26 [*sic*]	?	I	+38 [38+]	29 total + *	[5+] +11	46	[22+]	1½ +28			54	62	*He took*	I
	Total [138½] ?	81	[31½+]	[39]	[72+]	[88]	63½	[36]	[26]				[29+]	[16+]	[46]		[29½]	[33+]	[40½]	[54]	[62] ...	*Total*	
II	*He owns* 80 58?	53			45 61		3	19 4	17½ 11½		II			17½ +11½ in his charge	15 +46	*	10		17½ 21½	17½	6	*He owns*	II
	Total ... [80]	[111]			[106]		[3]	[23]	[29]					[29]	[61]	+2 [2+]	[10]	—	[39]	[23½]	[8]	*Total*	
III	*For Tobe*		?		8* 104		63½	22	29 ?		III	*			61 a total . . . . . +15 S-g.		29½	46	*9	28 in his charge		*For Tobe*	III
	Total 158	21		40	184+									29	[76]	*					*	*Total*	
IV	*In his charge* 2				18						IV							28½	2		61	*In his charge*	IV
V	*The Surplus*		* the surplus + 141				41	1* a total	* total		V						19½					*The surplus*	V

[1] S-g. = Small-grained. [2] L-g. = Large-grained.

[1] At end of account; possibly separate account.

The fragmentary accounts were originally of great interest. o.96 and o.103 contain mention of money, and if such accounts had been extensive they would have proved a most valuable corollary to those of the spelt. All the account fragments seem to belong to the same date and there can be little doubt that most of the same people would have been found recurring. It will be noticed that the sums of money mentioned are large, as were those of spelt. Pelilu's share, one item being missing, is 77 silver debens, i.e., 1,540 silver drachmæ. Taking the figure for the price of wheat at this date, quoted above, of $3\frac{2}{6}$ silver drachmæ, this is equivalent to 462 artabæ of wheat, or with the ratio of 5 : 2, 1155 artabæ of spelt (what size of artaba is not known) : o.103 appears to be on the same generous scale.

O. 165, line 3, mentions " The fresh priests," or " The priests who enter ; " may this not be the new phyle coming in ? No indication of the unit is mentioned here. See the mention of " the priests who enter " in *Dem. Pap. Cairo*, 31080, quoted above p. 163.

The fragments, of which extracts only are published, are evidently for Phamenoth, and a more complete study of these fragments than Mattha was able to make, might repay the labour. Two interesting items here are for the " Pastophoroi of the statue " and the " Pastophoroi of Isis of the gebel."

Class VI

The great difficulty in trying to ascertain connections between the different persons whose names occur in various documents is the frequent occurrence of the same name. It is evident that at the Bucheum many people, even at the same date, were named Petosorbūkhe and Peftumont and did not acquire any nickname (at least for documental purposes) as do people whose names are alike when they are employed upon excavations.

To simplify the references an index of names has been made (Vol. II, pp. 82–84). The index is divided into three sections, Hieroglyphic (arranged according to the order of the hieroglyphic alphabet), Demotic (do.) and Greek and Coptic (arranged according to the order of the English alphabet).

After each name is given its source, followed by the date wherever known. In the case of relatives, such as X son of Y, the second name is repeated in its alphabetical place, Y father of X, etc.

Despite considerable study of these names, it has not been found possible with very few exceptions, to identify the same people on different documents. Exceptions are :—the Kala-siris family, occurring both on the Demotic sandstone stela o.200 and on the first Augustus stela (inscr. No. 13), and Wah-ib-Re' who is mentioned on offering table (Inscr. No. 37) and also on cartonnage Br. Mus. No. 6969. There are odd names which might be connected but they would not help in building up families, because there are not enough data, and there would be considerable guesswork in connecting them. Notice, however, *P-šr'o-pḥt* of o.30 and P3-*srt*'-'3-*phti*' of inscriptions 29 and 32, and compare *Ta-Pwny* of o.132 with *P-'Imn-pwny* of inscription 13. May there not be some connection between *Ty-Ḥnm* of o.30 *Ti-Ḥnmt*, Mother of Buchis, in inscriptions 8 and 9.?

A name of interest is Petosorbūkhe. In *P. Tebtunis* 313, A.D. 210, there is Petosorapis, son of Petosorapis, a priest of Mnevis at Heliopolis. (The same man was chief embalmer both for Apis and Mnevis.) Peftumont we believe to be the first occurrence of a person named after the four Mentus (of Armant, Madamūd, Thebes and Ṭôd.).

An effort was made to trace connections between the Petemestous of the situla and the mummy with the same name in the British Museum, but without success.

Padēme is a local name, meaning " he of Dēme ", Dēme being the name of the Western bank which centred round Medinet Habu. (See Winlock and Crum, *The Monastery of Epiphanius*, Vol. I, p.4.)

Senplenis occurs in *Theban Ostraka*, p. 152, 133, 2nd cent. A.D., and there are four further examples in Preisigke, *Namenbuch*.

It is not always easy to discover the purpose of the ostraka inscribed with names and lists of names. The examples from tomb 205 are almost certainly mummy tickets. The longer lists, like o.175, may well be lists of workmen engaged for the excavations or for some similar purpose.

The most interesting are the pebbles found at the north end of the Bucheum, some of which are inscribed " belonging to X." Baly deals with the question of these pebbles in chapter XVI. He argues that these pebbles are votive offerings intermediate in sequence between the small private stelæ and the plain pebble which is dropped on a Sheikh's tomb to-day. Prof. Griffeth pointed out that the use of *Pa* N. " belonging to N." is evidence in favour of this theory.

Just as the pebbles with names on them descend from the small private stelæ and precede the plain pebbles, so the stela with an engraving of Buchis and Mentu, accompanied by two names, must be in direct descent between the private stela with a full inscription and the sandstone stelæ with no names, but with a picture and, later, a design. Both are descendants from the normal inscribed private stela, but in parallel branches.

Names compounded with Buchis are not common and a list of all those that it has been possible to trace is given here. A number of these were found with the aid of Preisigke, *Namenbuch*, but by no means all of them occur in that volume. An index of those from Bucheum texts will be found in Vol. II. The infrequency of such names may suggest that his worship was not a popular personal religion.

Greek

Name	*Reference*	*Date*	*Provenance*
Ὀβύχις	*P. Meyer, Ostr.*, 10	Ptolemaic	Upper Egypt
Π[αβο]ῦκις	*S.B.*, 4636	III Cent. A.D.	Panopolis (Akhmîm)
Παβοῦχις	Wilcken, *Ostr.*, 307	,, ,, ,,	Thebes
,,	Tait, *Greek Ostr.*, Bodleian 11	242 B.C.	,,
,,	*P. Paris*, V, 31, 1	114 ,,	Qurneh
,,	Tait, *Gr. Ostr.*, Ashmolean 78	Roman period	?
,,	,, ,, ,, Petrie 311	III Cent. A.D.	Hermonthis
Παβῦκις	*P. Amh.*, II, p. 128	A.D. 128	Ashmunên
Πβοῦκις	*P. Lond.*, III, p. 20	89 B.C.	Pathyris
,,	*B.G.U.*, VI, 1259	100–99 B.C.	,,
,,	*P. Grenfell*, II, 24	105 B.C.	Crocodilopolis
Πιβοοῦχις	*P. Amh.*, II, p. 66	A.D. 124	Dîmē
Πιβοῦχ[ις] (& *Ἐριεῦς*)	*P. Meyer*, Ostr. 59, 4	A.D. 70	Upper Egypt
Πιβόχις	Wilcken, *Ostr.*, 402	A.D. 52	Thebes
,,	Wessely, *Studien zur Palæographie und Papyruskunde*, X, 298	VII–VIII Cent. A.D.	Memphis
Πιβῦχις	Viereck, *O. Strassb.*, 328	A.D. 30	Upper Egypt
Πετεβοῦχ[ις]	Wilcken, *Ostr.*, 1172	II–III Cent. A.D.	Thebes
Πετευσορβοῦχις	*P. Lond.*, 610	II Cent. B.C.	Upper Egypt
Πετοσορ[βοῦκις]	*Archiv.* V, p. 176, No. 27	A.D. 216	Thebes

Name	*Reference*	*Date*	*Provenance*
Πετοσορβοῦκις	*Archiv.* V, p. 173, No. 10	II Cent. A.D.	Thebes
,,	,, VI, p 219, No. 3 (=*S.B.*, 7397)	II Cent. B.C.	,,
,,	*O. Strassb.*, 14	139–151 B.C.	,,
Πετοσορβοῦχις	*P. Paris*, V, 8, 2	114 B.C.	?
,,	Wilcken, *Ostr.*, 1196	Roman	?
,,	Tait, *Gr. Ostr.*, Cambridge 41	A.D. 136	Memnonia (Thebes)
Σεναρβοῦχις	Wilcken, *Gr. Ostr.*, 436	A.D. 75	Charax (Thebes)
Σενβοῦχις	Tait, *Gr. Ostr.*, Petrie 323	Roman period	?
,,	,, ,, ,, ,, 324	?	?
,,	,, ,, ,, ,, 364	A.D. 8	Thebes, probably W. bank
,,	,, ,, ,, Cambridge 51		
Πσεννοσορβοῦχος	*P. Lips.*, 97, Col. X, 4	A.D. 338	Hermonthis

The " canal of Buchis " (*διῶρυξ Βούχεως*) is twice mentioned in *P. Lips*, 97.

Demotic

Name	*Reference*	*Date*	*Provenance*
Peteosorbuchis	Brugsch, *Thesaurus*, 1059	?	?
	P. Berlin, 31116		
	(See Spiegelberg, *Rec. de Trav.*, XXIV, 32)		
Petosorbūchis	Spiegelberg, *Inschr. Gebel Silsile*, 277, 281	Roman ?	Gebel Silsile
Pibuchis	*Ibid.*	,,	,, ,,
Psenbuchis	Tait, *Gr. Ostr*, Bodleian 20	245 or 220 B.C.	Thebes
Senbuchis	Thompson, *Theban Ostraka*, p. 62, 14	A.D. 92–93	Thebes

Class VII

The Dedicatory ostraka are unfortunately only two in number, of which 104 has a provenance proper and comes from Bucheum L. This was written on the side of a pot, of which more than half remained, containing a yellow greasy matter. It is the greatest misfortune that, owing to an accident in transit, none of this material reached England for analysis. This is doubly so since Mariette noticed a similar substance in pots in the Serapeum.

Classes VIII and IX

Neither the schoolboy's exercise nor the fragmentary and illegible provide any matter for comment.

The two sandstone stelæ, o. 200 and o. 201, have been commented on sufficiently by their translators, and o. 171 conveys nothing in its damaged form.

The tomb graffiti are commented upon in chapters V and XX.

ADDENDA

Mitteis and Wilcken, *Grundzüge*, Vol. I 1, p. 105, *Ὀσορβόχις* is mentioned.

Maspero, *Rec. de Trav.*, Vol. XXIII, p. 48, argues that the Bacis of Macrobius is equally legitimate with the Greek *Βοῦχις* or *Βῦχις* and that it represents an earlier tradition. Spiegelberg, *Rec. de Trav.*, Vol. XXIV, p. 32, suggests that it is a dialectical variant.

While this volume was in the press, Skeat drew our attention to a valuable document in the British Museum, and has kindly let us have the following note for insertion in this volume :

" The final publication of the excavations at the Bucheum makes it very desirable that the text of *Pap. Lond.*, 610[1] should be printed in full. This document consists of fragments of a roll, originally containing at least nine columns of writing ; it is apparently a series of copies of official documents relating to a dispute between the priests of Pathyris and those of the Bucheum at Hermonthis, and dates from the end of the reign of Ptolemy VI Philometor and the early years of Ptolemy VII Euergetes. The dispute, which led to bloodshed and official intervention, concerned an island in the Nile.[2] The papyrus has been briefly described by Grenfell and Hunt in *Archiv.*, Vol. I, p. 57, and ten lines were quoted by Grenfell, *Greek Papyri*, Vol. I, p. 24 (not p. 64 as stated in *Archiv.*, Vol. I). It may be added here that there are references to the γῆ Βοῦχιος 'ιεροῦ ζῴου, or Βούχιος θεοῦ μεγάλου, ' land of the sacred animal Buchis,' ' land of Buchis the Great God,' and one of the priests bears the name θο[. . . πετε]νσορβούχιος ' Tho . . . son of Petosorbuchis.'

It has accordingly been decided to include this important document in Vol. VI of the *Catalogue of Papyri*, now in preparation, which it is hoped to publish next year."

O. H. M.

[1] Misquoted by Otto, *Priester u. Tempel*, I. 349, as *P. Lond.* 590.

[2] There is a large island near Armant at the present day.

CHAPTER XX

CHRONOLOGY OF THE TOMBS

As is abundantly clear in other sections of the book the evidence for dating the different burials by each set of criteria is slight and when an attempt is made to fortify the evidence of one set by that of another, contradictions appear to arise. The architecture of the Bucheum and the Baqaria are only broadly comparable, and little cross dating between the two sites can be obtained. The sources of information can be classified as follows :

I. *Written evidence.* Stelæ. Offering tables. Ostraka. Reused blocks. The inscribed sarcophagus.
II. *Architecture.* The positions of tombs. Size and form. Details of brickwork.
III. *Sarcophagi.*
IV. *Eyes.*
V. *Other funerary furnishings.*

I. The stelæ, which by themselves should have solved all problems of dating, have to be treated with caution, owing to the plentiful evidence for their having been frequently moved. Only one offering table was dated and that, though belonging to the Ptolemaic period, was found outside a Roman tomb. Only one ostrakon, 0.104, can be attributed to a particular tomb, Bucheum L, and this ostrakon cannot be dated more closely than to the Middle Ptolemaic period. Reused blocks with graffiti give a *terminus post quem* dating, useful in two cases ; a block from the wall of D, 0.201, is Late Ptolemaic, possibly after 119 B.C., and a block from below the stela of 22, 0.200, is after 54 B.C. The inscription on the sarcophagus of Bucheum 18 is neither datable by its content nor on palæographical grounds, but the existence of an inscription on this sarcophagus alone of the sandstone examples indicates that the sarcophagus was earlier than all others made of this material.

Tomb graffiti are not very satisfactory criteria as they yield only palæological evidence for dating, which, in the case of these rough tomb markings, is not altogether reliable. Bucheum 6 can be dated to the Roman period by the numerals on the stone ; and the evidence of the writing in Bucheum 7, 8, 11 and N is in favour of their belonging to this period also. Bucheum D can be placed in the late Ptolemaic period on the same grounds.

II. The positions of the tombs are an uncertain guide. A few burials placed in the passages are obviously the latest, but in the case of the others it is possible that tombs were well spaced at first and that later the intervening spaces were used. In the Bucheum especially the probability of early separate tombs, widely spaced, must not be ignored. One or two broad divisions of style can be made, both in the Bucheum and the Baqaria, but not more. The three main classifications of brickwork, A5, A6, and B, correspond with three broad divisions of date.

III. The two main classes of the sarcophagi M. (monolithic), and P. (polylithic), are equivalent to two periods of time, but the subdivisions of the latter, if taken in direct order

of decadence, run so contrary to other evidence that they are a source of confusion rather than assistance.

IV. The eyes have a better typological sequence than any of the other objects, but one or two examples are so flagrantly out of place when the typology is applied for dating purposes, that it has been ignored in working out the chronology. In the chronological register at the end of the chapter the eye types are inserted against the burials, and it will be seen that with three exceptions (type II in Bucheum 19, type X in Baqaria 9, and type III over Bucheum B) the types correspond with the chronological order, not individually, but taken broadly as Early, Middle and Late. The absence of closer correspondence is understandable. Brunton has shown with the amulets of the First Intermediate Period (*Qau and Badari II* Amulet and Bead Corpus, Pls. XCIII–XCIX) that, although good types are early and degraded types are late, degraded types may also be early, since poor copies may be made by inferior or careless workmen at any time. Thus it is only in groups that they are useful for dating. If there were groups of eyes in each tomb it would probably be found that on balance the typological order corresponded with the chronological order for each tomb, as it corresponds now for groups of tombs.

V. The pottery is practically useless for dating. Stone amulets, found in some of the tombs but not in others, are generally accepted as being not later than the Ptolemaic period. At the Bucheum bead nets are portrayed only on the late Roman stelæ, but found only in early Ptolemaic burials. The few finer objects such as the inscribed metal bottle and the inscribed *nms.t* jar were found in the Bucheum rubbish heaps.

The order deduced below for all the tombs is a logical deduction from the evidence available, weighing the stronger against the weaker, but much in the development of the Bucheum was not logical, and the interpretation is open to doubt. Nevertheless, it has seemed best to put down the excavators' conclusions, since it is unlikely that further evidence on this point will come to light, and conclusions, which have been arrived at after study of all the evidence on the spot, are preferable to no conclusions at all.

The Bucheum.—Though 10 was one of the most thoroughly robbed burials in the Bucheum, its date can be decided without difficulty. The fragment of the Nekhthorheb stela was found in the vault west of the burial, which is assumed to be a vault for offerings. This vault had fallen away inside and been repaired, and, among rubbish thrown out from the Bucheum, was found the *nms.t* jar inscribed for Nekhthorheb and Buchis. The bricks of the outer and original vault belonged to the A5 type of brickwork, which was found also in Baqaria 30 and 31—certainly the two earliest cow burials. The granite sarcophagus, similar to those of the Serapeum, would naturally be regarded as the first of the series. Above all, the architecture of the tomb, with its stone vaulting and the offering vault, is so much finer than anything else in the Bucheum that it at once suggests an initial burial. Close to it was found an eye of the same type as that found in Baqaria 30.

At a first glance the monolithic sandstone sarcophagi, headed by the inscribed example (18), might be expected to follow 10, but other evidence contradicts this. The two fragments of the stela of the Alexander the Great bull were both found in the neighbourhood of G[1] and H.

[1] The country was badly governed in the reign of Alexander the Great, and this may explain the lack of a sarcophagus in G. On the other hand building was in progress in Upper Egypt in the reign of Phillip Arrhidæus and this leaves the same feature of 16 unaccounted for.

The spacing of the tombs G, 16 and 18 suggests this order rather than 18, 16, G, when the position of 10 is taken into consideration. The brickwork of G is similar to that in 10 and in Baqaria 30 and 31. The clinching reason for accepting this order is that the same type of burial as G and 16 occurs in Baqaria 33, which can be shown without doubt (see below) to be the third burial. The first of the Baqaria tombs, which must be either 30 or 31, both with sandstone sarcophagi, must obviously be equated with 10. The fact that they have similar sarcophagi is best accounted for by the supposition that the cow buried in the later tomb also died in the reign of Nekhthorheb. Burial 33 in the Baqaria belongs to the mother of the bull of Alexander IV and must be equated with 16. Other facts which support the order G, 16 are :

(1). The amulets ; a faience triad and other faience amulets were found in G, whereas stone amulets were found in 16. (The amulets from burials which were undoubtedly later were all of stone.)

(2). In G there was a mud brick wall each side of the outer chamber, but in 16 there was a ledge, the prototype of the niches in the later burials.

(3). The pavement over the forecourt of G is not repeated in 16 or any other burial ; there was a chamber over the burial in G, and a similar chamber was begun in 16 but was not finished to the same depth, and no similar construction is ever subsequently found.

(4). Parts of faience amulets were found in Baqaria 33.

There is every reason to suppose that 18 is the next burial in order, that of Ptolemy I. It is inscribed and represents a partial return to the splendours of 10. It retained the mud ramp for sliding on the lid, just as the mud ramps were retained for the mummy in G and 16. It is the only example of this type of burial with niches in the fore chamber and not in the rear (showing its descent from 16). Though the spacing gives no choice in order between 18 and 14, it shows that 14 should precede H. The resemblance between the two chambers and sarcophagi of H and 14 (both the latter have drainage floors) indicates that H followed 14 immediately (but see note below on S). The next section is very difficult and it is better here to begin at the end and work backwards.

The terminal date of the Bucheum and Baqaria is uncertain. At first sight it would appear to have been at the end of the reign of Diocletian but, though this is the more probable theory, there is certain evidence which supports a later date :

(1). The temple of Serapis at Alexandria was not destroyed until the reign of Theodosius I, and Dr. Milne holds it likely that in Upper Egypt the pagan religions survived still later. (J. G. Milne, *A History of Egypt under Roman Rule*, p. 95.) There was an Apis at A.D. 362.

(2). The coins which were found in the Bucheum, indicating the date of a robbery, do not begin until the reign of Constantius II.

And (3), there is the Petrie stela and the Cairo stela, both unaccounted for and similar in type to the cow stela belonging to the Diocletian burial at the Baqaria. If there were a burial in the Bucheum later than Diocletian it would probably have been in the passage, where it might have been destroyed by robbers, or placed separately like Baqaria 29. Burials 20 and 19 are fixed by their stelæ to Diocletian and Probus and there is no reason to doubt the evidence of the stelæ, since it is confirmed by the position of the burials—in the passage. Burial 9 resembles 20 and 19 since it has no sarcophagus, and is delimited by burnt-brick walls. Also, it is built into the offering vault of 10 and may, for that reason, be assumed to be later in date than any tomb, except those in the passage itself. It is attributed to Valerian. Tomb 23

was cramped in the entrance of 6 and never had any sarcophagus. It is attributed to Maximin because it is certainly later than the others in this bay.

Burials 5, 4, and 3 may or may not have had sarcophagi, and, unlike 1, 2, 7, and 8, they do not narrow at the entrance as do other tombs of this period. They are therefore attributed tentatively to Caracalla, Commodus, and Marcus Aurelius. (It should be remembered that the imperial names and dates in the Roman period are only intended to indicate the approximate distribution of the bulls in this period, except in the cases of the dated bulls of Diocletian, Probus, Valerian, Antoninus Pius, Caligula, Tiberius, and Augustus.)

In Burial 6 the stones were marked with Roman numerals and the tomb is therefore likely to be subsequent both to 2, which was marked with Greek letters[1], and to 7 and 8, which were marked in demotic, as were tombs known to be earlier. It has been shown to be probable that the entrance to 6 from the West passage has no connection with the burial but was the first attempt at cutting the North bay, and was afterwards used for this burial (p. 32). The burial itself is attributed to the third bull of Antoninus Pius.

Burial 7 is fixed to the second bull of Antoninus Pius by the stela found behind it, in the space (7a) at the back of the South wall.

Tomb 8 is then probably the burial of the first bull of this Emperor, as the priests would surely have worked backwards up the entrance passage once they started to use it for cutting burials.

Tombs 1 and 2 are similar in construction, for they are the only two burials in the North bay with narrowed entrances. All the stone except part of the bottom layer had been pulled out of 2 and it seems probable that 1 lost its sarcophagus in a similar manner. Part of the roof of 2 was found in the passage and the fragment showed that the sarcophagus type was P.1. On the stones of 2 were cut Greek letters. It is surprising to find these in a sarcophagus apparently intermediate in date between two groups carrying demotic inscriptions, but it is worth noting that there was a revival of interest in Greek matters during the reign of Hadrian, who visited Armant. Tomb 2, by its position, would be subsequent to 1 and these two burials are attributed to Hadrian and Trajan respectively.

To agree that all these burials were subsequent to those in the South passage it is necessary to accept the view that the type of sarcophagus which occupied the former (poor forms of), PI, represented a renaissance in sarcophagus manufacture after the extremely poor work in the South passage. The evidence for this order rests almost entirely upon the placing of the stelæ. To accept any other order would mean believing that the stelæ were moved from the North bay and re-erected in the South passage, and, though it is certain that the stelæ were frequently moved, such a complete rearrangement could only have been caused by incredible stupidity.

The next two burials to be considered, N and O, present more difficulties than any others, except the group 17, L, M, and S among the early burials. They had sarcophagi, not of the type PI, but of type PII, more closely related to PIII than PI. Further, they contained stone amulets, which have always been assumed to cease after the Ptolemaic period. However, if the amulets make it difficult to accept the view that the burials belonged to the middle of the Roman period (about the time of Hadrian and Domitian), it is still more difficult to place them elsewhere. There are enough burials definitely of Ptolemaic type to account for all the Ptolemaic

[1] Mariette states that he did not find a single Greek letter in the whole of the Serapeum (*Le Sérapeum de Memphis*. App. p. 123).

bulls. (See Chart, Pls. CLXX–CLXXI.) Moreover, if they were Ptolemaic they could only have occurred in the middle of the reign of Ptolemy V, where the consecutive series of stelæ which are assumed to have been *in situ* begins. Here again the same difficulty about the movement of stelæ from the north end of the North passage down into the South passage arises, and, moreover, to date the tombs to Ptolemy V would infer a very strange order in the original excavation of the tombs. The strongest arguments in favour of these burials preceding 1 and 2 are :

(1) their position, which is what might be expected if the other premises as to the general order are accepted ;

(2) the graffiti, which are classed as Early Roman ;

(3) an inscription on a roofing block of N giving " Year 4 "—since by " dead reckoning " this tomb was attributed to year 3 of Vespasian.

and (4) the blocking of the passage end of the sarcophagus of O, which resembles that used only in 12 and 13. If this view be accepted, the current opinion about the terminal dating for stone amulets must be revised—unless we assume those from N and O to be earlier objects taken from elsewhere in the Bucheum and reused. There does not seem to be much evidence for the accepted view, except that in the Bucheum itself there were decadent glass amulets in the Tiberius burial C, following closely on those in stone from the first burial of Augustus, B. Nevertheless, it appears impossible to make any chronology at all for the tombs in the Bucheum unless this position for N and O can be accepted, and, therefore, a Roman date for stone amulets.

These tombs would then be preceded by 13, 12, and 11, the three earliest examples of the PI type of sarcophagus, which begins in tomb 11, in the middle of the reign of Tiberius.

The group of tombs in the South passage, excepting the earlier burials, presents no very great difficulty. The stelæ of B and C, Augustus (first bull) and Tiberius, bore every evidence of being in their original positions. They rested directly, with no intervening rubbish, on the slabs in front of the tomb blockings. Moreover, with B, the remains of a plaster mask found upon the face of the stela and in front of it, showed clearly that the stela had never been moved. Fragments from the face of the stela of Ptolemy VII were found underneath a burnt-brick buttress in front of K, on ground level, and the original position of this stela seems therefore sure. The stela in front of F, Ptolemy V (second bull) had undoubtedly been moved and less reliance can be placed upon the evidence which it provides. There is no exact evidence about the finding of the rest of this group of stelæ, other than the numbers of the tombs in front of which they were found (in 1928–29).

Architecturally, the order of the tombs coincides with the positions of the stelæ, except that there is no tomb in this end for the bull of Ptolemy XI (see chart). Tomb 15 (sarcophagus type, P. III), sandwiched between two earlier burials in the North passage, seems the best choice for this. The fragment of stela, attributed by Fairman to this bull, was found in the North passage. Tomb K might be expected to be the last of this series before the renaissance, but this does not appear to be the case. The poverty of this burial may be explained by the previous political disturbance at Armant. The bull was buried in 125 B.C. and the city may have been heavily fined and suffered reductions of privilege because it held out against the King for Kleopatra II in 130 B.C.[1] The best burial of this class was B, although made immediately after Augustus had

[1] The decree proclaiming a political amnesty and promising payment from the royal treasury for the expenses of the burial of the sacred animals, was not issued till 118 B.C. (*P. Tebtunis I*, 5).

assumed control of the country. Possibly the burial was prepared in the reign of Kleopatra, who paid special attention to Armant ; she built a temple there and it is recorded on the Bucheum stela that she rowed Buchis in the bark of Amūn at his induction. On the other hand, the stela contained the name of a certain Kalasiris and his mother, and they would hardly have obtained this privilege without a considerable payment towards the expense of the burial, some of which money was no doubt used for that purpose. The greatest difficulty arises with the first burial of this class, that of Ptolemy V, F. The bull was buried in the twenty-fifth year of the king, six years after peace had been restored in Upper Egypt. The possibility of the tomb being constructed before the restoration of peace, or immediately afterwards, must be kept in mind, but, even if it were not made till the death of the bull, it seems very likely that this part of the country would have been impoverished from the wars which had apparently been raging since the sixteenth year of Ptolemy IV. How much Armant was involved in these it is difficult to discover, but the reason for the spell of poverty between the middle of the reign of Ptolemy V and the middle of the reign of Tiberius may have been a confiscation of revenue at the earlier date for which there was no compensation till the later. It is not difficult to accept the first part of the theory, knowing the shifts to which Ptolemy V was driven to raise revenue, but a restoration of property by Kleopatra might have been expected at the time when she was interesting herself in Armant. All such explanations must remain little more than guesswork at present.

There remain the three burials which are the most difficult to date in the Bucheum, 17, L, and M. If the previous deductions have been correct, these three burials must belong to the bulls of Ptolemy III, Ptolemy IV and the first bull of Ptolemy V. They are preceded by three well-cut tombs, with monolithic sarcophagi, and they are followed by a poor tomb with a sarcophagus of the PIII type. Tomb S, a well-cut example of the type which precedes these (14 and H) and was never finished, must be considered at this point, as it must have been intended either for one of these burials or for the second bull of Ptolemy II, finally buried in H. The latter supposition is supported by the way H is wedged between 14 and G. It is incredible that the builders should have started a tomb of this type after these three poor examples. The evidence for dating the tombs is unsatisfactory and to some extent contradictory :

(1) The stela of Ptolemy IV was found outside 14, where it was placed presumably in Roman times. This provenance can therefore be ignored, but it is perhaps likely that its original position was the nearest possible to that in which it was found.

(2) An uninscribed stela was found by Dr. Frankfort, on the east side of the North passage, somewhere between 14 and 18.

(3) No inscribed stela was found either of Ptolemy III or for the first bull of Ptolemy V. (I suggest, very tentatively, that the stela for the first bull of Ptolemy V may have been dedicated to one of the rebel dynasts and subsequently destroyed, but this suggestion would carry more weight if all the other stelæ of this date were known.) The use of an uninscribed stela in the reign of Ptolemy III is inexplicable in view both of his great activity on behalf of Egyptian gods and also of the bilingual inscription (No. 26) for a temple of Buchis dating from his reign.

(4) Tomb M contained a monolithic sarcophagus and might therefore be expected to be earlier than L or 17, since

(5) Tomb 17 had no sarcophagus and L had only a few blocks from a polylithic example.

(6) Tomb M appears to be later than L for three reasons, all architectural, which outweigh the two preceding. (*a*) It is at the end of the passage ; (*b*) it has no niche such as L shows in a decadent form ; and (*c*) it seems to have been dug with a view to avoiding L, as witness the sudden step to the north and the inward bulge where L reaches farthest north. That L should have been dug so as to curve round almost into M is unthinkable.

(7) Tomb 17 contained a large number of amulets and the remains of what was possibly a bead net. L and M contained the remains of bead nets and one or two amulets. (No amulets being found in F does not affect the argument, as the occurrence of amulets is sporadic throughout the Bucheum and the Baqaria and without dating significance.)

(8) The spacing is too irregular for it to be possible to deduce from it whether 17 was dug first or intruded between 16 and 18 after the excavation of M and L.

From the above it seems safe to deduce that M followed L, but there is little upon which to decide further. L and M probably succeeded each other directly, as there is no troubled period at the date of the death of the Ptolemy IV bull, which would account for an insignificant burial in between. The only argument in favour of attributing 17 to Ptolemy IV is the position of the stela and this is not a strong one. Still less is there any reason for a poor burial in the reign of Ptolemy III, and the loss of that stela is probably accounted for by robbery. As the date of the burial of the first Ptolemy V bull coincides with the rebellion, this is the most likely date to which to attach 17, giving the order, L, M, 17. Since L was obviously excavated to contain a monolithic type of sarcophagus, it is necessary rather to explain the absence of one there than the presence of one in M. The only explanation that can be put forward is that the sarcophagus suffered some accident on the way to its destination, and this can be believed the more readily since the lid of H was missing.

The results of the above examination of the dating evidence are tabulated below (p. 178). In the burial dates, a date without comment indicates that the date is fixed by written evidence ; " C " indicates that the date given is that of the birth of the succeeding bull, which the evidence of the inscriptions shows is never far distant from that of the death of its predecessor ; where " stela " is noted, that the inscription cannot be read with certainty ; and a query that the date is purely hypothetical, arrived at by dividing the period between the known burials into lengths as near as possible to the average life of a bull at that period. In the list of Bucheum tombs, underlining indicates that the attribution is certain ; no comment, that it is reasonably certain ; a query, that it is doubtful ; a bracket joining several tombs, that, whereas the date of the group is fixed, the individual attributions are doubtful.

The Baqaria.—Something has already been said about the first three burials in this site. There is no doubt that 30 and 31 were the first two burials, but it is not possible to decide which of them was the earlier. The next in time was certainly 33, for the following reasons :

(1) It is the only remaining burial on a large scale ;

(2) It is the only one (except 32, half-way along the North passage) which contained amulets ;

(3) These amulets were faience ;

(4) The pit leading down to it was cut in the centre of the passage-ways leading to the other burials. It is easy to see how such a pit would be filled in, the burial behind it walled off, and

passages taken across it ; but it is inconceivable that such a pit should be dug in the centre of all the passages at a later date, when it would require more labour for its construction than would be needed for adding several more tombs to the end of either passage.

The dating evidence for the rest of the tombs is not so strong, but, where they cannot be dated individually, they can be satisfactorily divided into groups. The eyes and remains of crowns are the only *objects* that can be used for this purpose and the Bucheum has shown that these are unreliable. The offering tables are worse than useless. The only dated offering table found, IIc, came from outside 25, undoubtedly a Roman tomb, and belonged to the first century B.C. Hence it would not be safe to place much reliance upon the evidence of Commodus stela, found outside 27 or 28, though it will be seen later that the attribution of this stela to 28 fits the rest of the evidence.

The shapes of the tombs are practically the only guide. Taking the tombs in reverse order, burials have been suggested to account for the Petrie and Cairo stelæ, at least one of which was probably later than Diocletian. The last actual burial found was 29, south of the Roman village, attributed to the mother of the bull of Diocletian. Immediately prior to this were the three burials in the North passage—37, 36, 35 in this reverse order. The presence of these burials is not quite certain, but without them the complement of cows would be incomplete.

Directly preceding these falls the group of red brick vault tombs. Of these 28 is certainly the last, as a glance at its position will show, and 22 is the penultimate, since for its construction it was necessary to extend the passage further than to build 27—obviously the antepenultimate.

Because the passage wall, which passes in front of 26, turns the corner into 21, 26 must have been built before 21. The order of the next four is open to doubt, but 20 turns south to avoid 19 and is therefore later than that tomb, and for similar reasons 25 is later than 24. The vault of 19 has no back wall and no blocking, that of 20 has a back wall and no blocking. The vaults of 24 and 25 both have back walls, but, whereas 24 has a blocking but half a brick thick, that in 25 is of the same thickness as the walls and level with their ends. Thus a clear evolution of these vaults is observable and the reverse order of the tombs is probably 25, 24, 20, 19. Of 23 and 18, the latter is nearer the top of the passage and on the east side, which was usually used before the west in the Bucheum. At the far end of the North passage, where the last burials would be expected, 16 shows close affinities to 18 and 23, with a similar ledge round it. Assuming 15 not to be a burial, the reverse order of the next three tombs by their position would appear to be 14, 17, 4 ; but by shape 4 has more kinship with 16 than either of the others, and 17 resembles 7 more than 14. The evidence is thus too conflicting for it to be possible to do more than bracket these three tombs together.

The remainder of the tombs form three groups, each merging into the next: 7, 32, and 6, rectangular, averaging a little over three metres by one and a half metres, merging, through 5, into a further group of three tombs; 10, 9, 8, rounded rectangles, about two and a half metres by one and a half metres, merging again through 3 into a group of five tombs; 2, 1, 13, 12, and 11, long rectangles averaging about four metres by one-and-threequarter metres. There seems no reason to doubt that this is the correct reverse order of the groups. The habit of building on the east side of a passage is pronounced in the earlier stages of the Bucheum. As to the individual tombs, in the first described group, 32 and 6 are both shallow (see the elevation) and it seems reasonable to place these in the reverse order of 7, 32, and 6. Tomb 5, as the intermediate before the next group, is next. There seems no reason to doubt that the reverse order in the next

group was 10, 9, 8, unless 9 succeeded 3, which it might have done since it is the roundest. In view of this possibility, these three tombs are bracketed together. New sections of passage were probably excavated for each of the tombs in the next group as they were needed, thus giving a reverse order—3, 2, 1, 13, 12, 11. Moreover, the shapes of the individual tombs support this theory, 2 being slightly less rounded than 3, and 1 less rounded than 2. Tomb 1 has a slight ramp and 13 a more pronounced one. The shape of 12 is obscured by the first attempt at a passage, labelled 34. Tomb 11 may have been excavated from the original passage, 34, or may have had a slight forecourt.

The probability that the above general order is correct is increased by the bulge in the passage walls north of 3 and 32, under the temenos wall. This bulge surely represents the termination of the passage when 3 was dug. When the passage was extended after the excavation of 32, a clean cut was not made. Notice also the increased depth of 7 compared with 32, and its slightly larger size, leading on to the group 17, 4, and 14.

The Robberies.—There is some interest in the different dates of robbing. All the monolithic sarcophagi, except Bucheum 10 and H, were robbed during the occupation of the Bucheum, and afterwards resealed. Some doubt remains in the case of 10 because the lid was subsequently quarried away and it was thus impossible to tell how much it had been damaged previously. Because of the nature of the lid, it is also uncertain whether H was robbed twice or not. The hole in the side was certainly made by later robbers, for they made a screen wall of *burnt*-brick to protect themselves, but it is possible that an earlier robbery took place and that the damage was made good. In M, 18 and 14, robbers made a hole in the corner of the lid and this was afterwards resealed with a boulder, set-in with a pink cement, similar to that used in fixing the polylithic roof to H. Later robbers made a second hole in the back corner of the lids, evidently not having discovered the former damage. It is curious that the later robbers worked along the backs of the sarcophagi and tunnelled through the intervening walls of rock, whereas the earlier robbers worked from the front. It has been argued (p. 145) that the later robbers worked in this manner because of falls of roof in the passages and the foreparts of the chambers which made it dangerous to work elsewhere than at the backs of the tombs. The first plunderers must have broken through the tomb blockings, for the only other route of access to the chambers, the robbers' passage, was clearly made by the later invaders, since it led directly from one to another of the holes by which they entered the sarcophagi. The first despoliation took place probably during the interval between the interment of the first and second bulls of Ptolemy V. It is difficult to imagine corruption or neglect on the part of the priests so great as to make this possible, for the circumstances were very different from those in ordinary cemeteries. Can this be connected with the change for the worse at this date ? It seems to be within the realms of possibility that the priests of Buchis, having supported the dynasts, either fled before the victorious forces of Ptolemy V and left the place open to any robbers, or that members of Ptolemy's army were permitted to rob the cemetery of a god who had " gone over to the enemy." Both suggestions are purely hypothetical but the former seems the more likely.

A few coins point to a date for the second robbery, though it is possible that they belong to yet another period of pillage : Bucheum 8, and 9, and Baqaria 6 and 8, all contained coins of the House of Constantine, indicating a robbery at about 350 to 360 A.D. This is an unexpectedly early date for the destruction of the pagan religions in Upper Egypt. Baqaria 30 produced a coin of Justinian (527–566), which may be the date of an attempt to obtain further loot from the Baqaria.

Natives stated that a small excavation was made by *Frangi* in the north end of the Bucheum about 25 years ago. We cannot trace any loot likely to have been the result of this, but the stelæ from this part of the Bucheum are missing, and if they were taken as recently as that they may yet be rediscovered.

A separate robbing must have taken place in the North bay and West passage within the last century, accounting for the stelæ in Cairo and the British Museum. The other stelæ which might be expected from this excavation are also missing. If anyone should notice these anywhere the authors appeal to them to supply information as to their whereabouts.

A recent robbery in the Baqaria also is proved by the offering tables bought in the village, and by the remains of a modern dead cow found in the south end of the South passage.

CHRONOLOGICAL REGISTER.

King or Emperor	*Burial Date of Bull*		*Bucheum Tomb*	*Eyes*	*Baqaria Tomb*	*Eyes*
Nekhthorheb	346 B.C.		*10*	I	30, 31	I
Alexander I	329		G	IV		
Alexander IV	311?		16		33	III
Ptolemy I	292C		18	III	11	
Ptolemy II	270		14		12	
" "	252	Unused	S, H ?		13	
Ptolemy III	234C	Unused	S, L ?		1	
Ptolemy IV	214		M		2	
Ptolemy V	195C		17	III	3	
" "	180		F		8, 9, 10	V, X
Ptolemy VI	162		D			
" "	145		E			
Ptolemy VII	125		K		5	
Ptolemy IX	101		A		6	VII
Ptolemy XI	77		21		32	VII
" "	53C		15		7	
Augustus	29		*B*	III	17	VI
"	A.D. 6		22	IX	14	VII
Tiberius	19		*C*	VI	4	
"	36		11		16	
Caligula	40		12		18	IX
Nero	55?		13		23	IX
Vespasian	71	Graffito	N		19	IX
Domitian	93C	Stela	O		20	IX
Trajan	109?		1		24	
Hadrian	125?		2	VIII	25	IX
Antoninus Pius	141C		8		26	
" "	144		7		21	
" "	157		6		27	
Marcus Aurelius	170?		3	VIII	22	VIII
Commodus	191?	Cow A.D. 190	4		*28*	
Caracalla	214?		5?		35?	
Maximinus	236?		23?		36?	
Valerian	358C		9		37?	
Probus	279C	Stela	*19*	II	38??	
Diocletian	295		*20*		29	
?	?		?		Petrie Stela	

CHAPTER XXI

THE BAQARIA VILLAGE

By H. W. Fairman

Immediately beyond the eastern temenos wall of the Baqaria were found the remains of a small village which covered an area approximately forty metres square (see plan, Pl. V). This village is squeezed in between the Baqaria and Burial 29 (some sixty metres east of the temenos wall), to the east of which lies the northern section of 'Ezbet esh Sheikh Yunis. Its proximity to the modern village has rendered it a happy hunting-ground for the native builders, and very little of the ancient walls now remains. Except in the cases of the temenos wall, a few walls in the complex RAJ—RAZ, RN and RK, hardly more than a single course of bricks remains standing in any part of the village. It has therefore been impossible to obtain complete details of brick bonds. The whole site has been so badly damaged that it is not even possible to decide the extent of individual rooms and houses, and hence, in the plan, it has been thought inadvisable to attempt to distinguish houses and rooms, and as a general rule each area enclosed by a wall or walls, or even a wall itself, has simply been lettered.

The village, before excavation, consisted merely of a big, irregular heap of *radim*[1], from a metre to 30cms. deep, in which no surface indications of walls and houses were distinguishable.[2] The whole area was literally red with some thousands of broken potsherds. In the course of the excavations all sherds, except minute fragments, were carefully put aside in a heap, and at the conclusion of the work were carefully examined with a view to typing them. All inscribed sherds had, of course, been previously put aside. Some idea of the number of sherds may be gained from the fact that the heap measured some seven metres by two metres by nearly a metre high, and that the work of sorting, classifying and typing took well over a week. Hardly a single complete pot was obtained in this way, and most of the typing was done from sections of pots. For this reason it has been impossible to give the precise provenance of the bulk of the pottery—a bare half-dozen complete pots were found *in situ*. For instance, the pottery deposit near SR contained neither a single complete pot, nor even a single fragment complete from rim to base. The majority of the objects, too, were not found in any particular connection, but were usually high up in the *radim*, and it has been felt that to give the exact provenance of most of them would be confusing and misleading.

The present state of the village may be gauged from the photographs on Pl. CI, 1, 2. Fig. 1 is taken from the south and shows on the left the temenos wall with, in the centre of the photo, the complex RE, and beyond it, to the east, RK, RJ. In the middle distance is RAJ—RAZ.

[1] *radim* — disturbed soil or debris.

[2] The *radim* also covered RBB etc. within the temenos, and though this area, strictly speaking, does not include the village, the *radim* over the whole area was so homogeneous that we shall treat RBB and the village as one.

Fig. 2 is taken from the east, looking across the site towards the high desert. The photographs illustrate far better than any words the appalling state of the village.

The central feature of the village was a large well, approximately 5.5 metres in diameter (Pl. CII, Figs. 1, 2, 3). It was impossible to clear out the entire depth of the well owing to our reaching the water level, but we descended nearly ten metres without reaching the bottom. On the north-east side (Pl. CII, Fig. 1) there begins a narrow, spiral ramp which descends to a depth of seven metres. The ramp then broadens out into a platform a metre wide (Pl. CII, Fig. 3) : the well, now considerably narrower, descends to an unknown depth below this platform. This well obviously served the whole village, and was the centre of an elaborate system of irrigation. At least two, and probably three,[1] water channels started at the well. The most common method of constructing the channels was to place a number of pots end to end (Pl. CII, Fig. 4), but in certain places pots were apparently not practicable, and the water was led through a channel made of burnt brick. Both methods could be used in one and the same course. Thus, the channel leading to RY begins with burnt brick, continues with pots placed end to end, and ends with burnt brick. None of the pots in this particular system was preserved, but their impressions in the cement in which they had been placed were still clearly visible (Pl. CII, Fig. 5). Burnt brick seems to have been used wherever there was an added force of water. Thus, at the point where the channel to RY joins that to RL the junction is of burnt brick (Pl. CII, Fig. 5). Similarly, burnt brick is employed at the entrance to the gardens RL, SH, and wherever there is need for the water channel to divide, or to twist and turn ; e.g. RZ—RY (Pl. CII, Fig. 6), or RL (Pl. CII, Fig. 7). The only exception to this is the watercourse from RAI which is apparently made entirely from pots. Unfortunately, the exact point of divergence of the two subsidiary streams was destroyed, but it seems exceedingly improbable that the junction in this case was of burnt brick. The watercourse RAI is of interest, since one branch leads to a number of trees, and the other leads directly to a small cesspool in which was found the skeleton of a dog.

All these water-channels appear to have been connected with gardens. There is no evidence that they were used for domestic purposes—with the possible exception of one of the channels from RAI.[2] In most of these gardens remains of trees were found (Pl. CII, Fig. 8 : RBH). They were made on the same principle as so many gardens in Egypt nowadays—comparatively small pits filled with Nile mud. Some of the pits seem to have been deeper than others (e.g. RY, which is 40cms. below the surface, and which is approached by a sharply-inclined watercourse ; so, too, RBK, which has, however, obviously been greatly disturbed by robbers), but this difference in depth may only be superficial, and is quite possibly due to the work of native robbers. The gardens vary in size, but are two metres in diameter on an average. Some were enclosed by a rough, single-course ring of large stones (SH ; SK—Pl. CII. Fig. 9) ; many were surrounded by a ring of burnt brick (RY, Pl. CII, Fig. 6 ; RL, Pl. CII, Fig. 7 ; RBL , Pl. CII, Fig. 7 : the burnt bricks of the latter may be faintly discerned surrounding the pot, and disappear

[1] The indefinite state of the ground at the mouth of the well made it impossible to decide whether the channel serving SH, SK joined that serving RL, RY, or whether it was quite separate. The channel to RBL probably branched from that to RL and RY, but it was impossible to form any definite opinion.

[2] It is possible, however, that the " cesspool " is a garden bed from which the mud has been taken, and the dog would thus be a later intrusion. No single trace of an encircling wall was observable, however, and this must speak against the garden theory.

under the floor of the room in the right centre of the photograph) ; in one case (RBH, Pl. CII, Fig. 8) the ring was made of mud-brick.

All the evidence points to these gardens having been the earliest section of the site. In almost every case we found that later walls and houses had encroached upon the gardens and watercourses. This is particularly clear in two instances. The garden RBL is half-covered by the floor of the room marked on the plan " frescoed[1] plaster walls " : this is shown in Pl. CII, Fig. 7. The mud-brick wall SL passes across the watercourse leading to SH, SK. There was no single observable instance of either a water-channel or a garden being either connected or contemporary with any house or room. There was also no indication that any garden or watercourse was later than any room.

The houses admit a far less satisfactory and definite description. As has already been mentioned, they have been almost entirely destroyed, but the remains show an odd mixture of carelessness and pretentiousness. Thus a very large number of the walls are built on *radim* (cf. particularly Pl. CI, Fig. 5 : the complex RAJ–RAZ seen from the east, showing the *radim* on which many of the walls are built, and, in the foreground, the foundation-course of a building at a lower level). In the majority of cases the lowest course of bricks was very carelessly laid, headers and stretchers being mingled indiscriminately, even stones and burnt bricks being employed,[2] and the whole method of building seems to have been careless and slip-shod to a degree. On the other hand, several rooms produced evidence of plastered floors and walls, one case (the room north of RL) even showing traces of a floral design in three colours, and six superimposed levels of plaster floors with thin layers of *radim* between them. The evidence of RAQ would point to at least two periods of occupation. In this room two ovens were built against the north wall on the original floor level, but at a later date two walls were built across them (Pl. CI, Fig. 4). Unfortunately, the material from the village is so scanty and incomplete that we can only record this fact. It is impossible to decide at what times the changes in construction took place, nor are such changes observable in all parts of the village.

Mr. A. F. Hallimond, of the Geological Survey and Museum, has kindly supplied us with the following report on the plaster : " The white plaster is a mixture of calcium carbonate with a large proportion of rounded sand, and also much angular quartz. The colours are laid on a coating of calcium carbonate, containing a small amount of sand."

We are also indebted to Prof. A. P. Laurie for the following notes on two samples of fragments of the floral designs which were submitted to him for examination : " One of these samples contains a red ochre laid over a yellow ground, the yellow ground proves to be yellow ochre. Another sample contains a green paint, which proves to be of the nature of terra vert."

Brick Bonds and Sizes.

It was impossible to obtain full details as to Brick Bonds, for in only five parts of the site was more than one course of bricks found in any wall. The following were noted :

Temenos wall : W. 2·5 a. 29 x 14·5 x 9.

RK–RJ : W. 1·5 a. 31 x 15 x 8.

[1] For " frescoed " read " painted."

[2] It should be noted that all walls were made of mud brick. Burnt brick was only employed deliberately in the enclosure walls of the gardens, and in a haphazard manner, together with stones, in the bottom courses of mud brick walls in the village. RE shows a strange variation in the use of hypocaust bricks in the lowest course.

RAM : W. 1·5 a. 31 x 12 x 9.
RAY–RAP : South east wall : W. 1 c.
SG : W. 1·5 a.
SR : W. 1·5 a. 29 x 14·5 x 9.
RBM : 33 x 15 x 7.

All these bricks were of mud. Burnt brick, as has already been noted, was only used in the walling of the gardens, and in isolated instances, together with stones, in the bottom courses of mud-brick walls. Surrounding RY, burnt bricks, greatly disturbed, of the following sizes, were noted : 28 x 13 x 7·5 ; 31 x 16 x 7, and 34 x 17 x 8·5. In RAI the bricks were 33 x 16 x 7. The following sizes, in addition to the above, were found by the water-channels, round gardens, and lying loose : 31 x 16·5 x 11 and 34 x 16 x 7.

The Date of the Village.

The date of the village can be fixed approximately by the evidence of the coins and lamps. The full details are given on pp. 115–116, and no useful purpose would be served in repeating them here. The evidence from these two sources is substantially in agreement, and indicates that the village was probably founded not later than the early fourth century A.D., and that it had a comparatively short history.

Thus far all is clear, but a difficult problem arises when we take into consideration the relationship between the village, the Baqaria and Burial 29. A study of the lamps which were found in 29 (see p. 91) and other considerations (see p. 77) make it certain that this burial was made early in the fourth century A.D., or in the late third century A.D., and very probably in the reign of Diocletian. Thus the first occupation of the village and 29 seem to have been roughly contemporary. On the other hand, it seems unlikely that the Mother of Buchis should have been buried in 29 if a small and somewhat *maskin*[1] village was already in existence between it and the other burials in the Baqaria. If the village existed before 29 we could reasonably have expected to find the burial to the north or west of the Baqaria, and not to the east of the village. Nor could such a state of affairs have obtained if, as we were at first inclined to believe, the village was a considerable settlement of priests, or of people connected with the Baqaria, though, of course, it is always possible that a few official buildings existed in the gardens prior to 29. The proximity of the village to the Baqaria, the finding of three small bronze bulls in the *radim*, and the possibility of there having been a small temple or cella there (a possibility which was disproved by further work) led us to presume that the village was one of bull-worshippers. This may well have been so, for the pagan cults lingered for a considerable time in Upper Egypt, but there is little evidence that would justify the assumption that the inhabitants of the village were people to whom the cult of Buchis and his mother was, to any great extent, a real and living force, or who had any close or intimate connection with the Baqaria.

The only possible explanation seems to me to be that 29 was the last[2] of the Baqaria series

[1] *maskin* — poor, miserable.

[2] Myers considers (p. 78) that though neither the bull with which it would have been connected, nor its grave has been found, the Petrie Stela *may* have been *later* than 29. He points out that it is quite a reasonable assumption for the cow of the last bull, which would have been destroyed by the Christians, to have died earlier and received a proper burial.

of burials, and that shortly after it had been made the worship of Buchis and his mother was discontinued, or was discredited (the process was probably a gradual one, and at first would only show itself in the lapse of the more obvious and official rites and ceremonies, while the popular and private veneration of the bull still carried on, just as so many ancient beliefs still persist in the Egypt of to-day). It may then well have happened that the people of the district came and made a small settlement close to the Baqaria. In making this choice they may have been influenced by two considerations : (*a*) the ease with which they could obtain building material from the Baqaria, and (*b*) the existence of a cleared area and gardens in the spot which they selected as the site of their village. There can be little doubt that the gardens, whatever their precise function may have been, were definitely in existence before the establishment of the village, and very probably before Burial 29 was made, otherwise 29 would surely have been placed closer to the other Baqaria burials.

Mr. Harden has dated the glass from the village to between the second and the fifth centuries, but, as he has pointed out (p. 96), this need not disprove the view that the village was established in all probability in the fourth century A.D. Similarly, the finding of three Coptic ostraka of the seventh century does not carry with it proof that the main inhabitation of the site continued down to that period.

The Objects.

The exact provenance of most of the objects from the village is of little importance, for the vast majority of them were found in no definite or significant connection with any part of the site, owing to medieval robbers who had razed complete houses in order to obtain burnt brick and other building material. It has therefore been considered best to group the objects under a series of headings such as " Metal," " Stone," etc., and to give, wherever it is possible or desirable, the provenence of each object.

Metal.

(*a*) *Coins.*—285 coins were found. They are discussed in detail on p. 115 ff. Photographs of a selection of the coins are given on Pls. XC–XCI, and a complete register on CLXVI–CLXVII. The most interesting of these are Nos. 1–22, which were found buried together in a hoard at RA. They were found in a small hole, ·60 metres in diameter, against the southern face of the temenos wall, 8·22 metres from the south-east corner, and ·13 metres below the level of the gebel. The majority of the coins are of Diocletian and Maximianus, but one (No. 22) is of the third year of Galerius Cæsar. The hoard, therefore, could not have been buried before 292 A.D.

(*b*) *Bronze.*

Model bull : 6·3 x 3·5cms. ; found on the gebel, 12·70 metres from RF, 3·00 metres from RBC. (Pl. LXXXIV, Figs. 1 and 2.)

Model bull : 5 x 5cms. ; found ·40 metres above gebel, 1·40 metres from TQ, 5·45 metres from the eastern temenos wall (Pl. LXXXIV, Fig. 2).

Model bull : 4 x 3·5 ; found in *radim* ·20 metres above RAM (Pl. LXXXIV, Figs. 1 and 2).

Ring : 2·8cms. diameter ; Baqaria R (Pl. LXXXIV, Fig. 1).

Among miscellaneous bronze objects found loose in the *radim* were a needle, a hand and arm from a statuette, a model axe-head, and a ram's head (Pl. LXXXIV, Fig. 1).

(*c*) *Silver.*—Small, simple ring : 2·8cms. diameter ; RBG (Pl. LXXXIV, Fig. 1).

POTTERY.

(*a*) A number of fragments of pottery figurines and baubos (Pl. LXXXII, Figs. 3, 4 and 5). Terracotta figure of a dog (Pl. LXXXII, Fig. 2).

(*b*) *Lamps.*—38 pottery lamps (Pl. LXXXI, Figs. 1, 2 (except No. 8), 3). All these lamps are typed and discussed in detail on pp. 91–92. The majority of them were found loose in the *radim*, but the following were found on gebel level :

RA. Fig. 2, No. 5.
RC. Fig. 1, No. 5.
RF. Fig. 1, Nos. 1, 2, 3, 7.
RAB. Fig. 2, No. 7.
RAV. Fig. 2, No. 3.

(*c*) *The Pottery*—The circumstances of the finding of a typing of the pottery has already been briefly mentioned (see above p. 179 ; cf. also pp. 84 ff). The following types were recorded (Pls. CXXXIV–CLIV, Photographic Pls. LXXIX–LXX, passim) :

7. c ; d ; d 1 ; d 2 ; g ; j ; l ; l 1 ; l 2 ; l 3 ; m ; n ; q ; r ; r 1 ; t ; w ; x.
12. a ; c ; d ; g ; h ; k ; l ; m.
16. b 1 ; b 2 ; b 3 ; c ; c 1 ; c 3 ; e ; f ; h ; j ; k.
20. g ; i.
21. e ; f ; f 1 ; h ; k ; k 3.
23. a.
26. d ; l ; m ; n ; o.
27. g ; p ; q ; v 3.
30. f ; h ; n ; r 2.
40. b 1 ; f ; f 1 ; g ; h ; h 1 ; i ; j ; k ; l ; m ; n.
41. c ; c 1 ; d 2 ; d 3 ; e 1 ; f 1 ; g 2 ; h ; j ; l 1.
43. c ; o.
45. e 2 ; g ; l ; q.
48. b ; d ; e ; f ; h ; i 1 ; j 1 ; k ; m 1 ; n ; n 1 ; p ; r ; t ; t 1 ; u ; v.
50. e ; h ; j ; n.
52. m ; n ; p ; q 5 ; r ; r 5.
53. c ; d 5 ; e ; f ; f 1 ; f 2 ; g ; g 1 ; g 5 ; i ; n.
54. c ; e ; e 1 ; e 4 ; f 1 ; h 2 ; h 3 ; h 5 ; j ; j 1 ; j 2 ; k ; k 1 ; k 2 ; l ; m ; n ; o ; r ; t 1 ; u ; w ; x 1 ; x 2 ; y.
56. g.
58. b.
61. g ; m.
67. d ; e 5 ; f 1 ; h.
68. e 1.
70. f ; f 1 ; g ; h 1 ; l ; l 1 ; m ; m 1 ; n ; o.
77. e.
81. e.
83. f.
85. f 1.
88. d ; k 1 ; l ; l 2 ; o 5 ; [illegible] 2.
92. d.

The pottery deposit north of RAQ (Pl. CI, Fig. 3) produced the following pots (the figures in brackets give the number of pots of each type) :

67. f 1 (3) ; 88. l 2 ; t 2 (2), and many broken fragments.

(*d*) *Ostraka.*—Four Coptic ostraka, Nos. 1, 3, 8, 143 (Pl. LXXIII) which have been dated to the seventh century. For a discussion of these ostraka see Vol. II, pp. 78–79.

STONE.

Neck and chin of a finely-worked basalt statue (Saitic ?) (Pl. LXIII, Fig. 1).

Head and shoulders (badly damaged) of a limestone statue (Roman) ; from the Well (Pl. LXIII, Fig. 7).

Broken torso of a headless Græco-Roman Statuette ; limestone ; 24 x 8cms. (Pl. LXIII, Fig. 8).

Limestone fragment with relief (Pl. LXIV, Fig. 4).

Limestone plaque, stela-shaped, with figure of a ram (?) in relief ; 4·5 x 5·5cms. (Pl. XCV, Fig. 7).

FABRICS.

Nothing of importance was found, and such fragments of material as were found were very small. We are much indebted to Mr. Midgley for the following report on a sample which was submitted to him : " A plain, regular and fairly close weave. The warp and weft are of equal diameter and well spun. The fabric and the fibre used for the yarn are exceptionally well-preserved. It is not flax. The surface markings on the fibre resemble those found on the best fibres taken from Indian nettles, such as *Girardinia* and *Villebrunea*."

BEADS.

See p. 129.

FAIENCE.

Many small fragments of blue glaze (cf. pp. 93–94) a selection from which is given on Pl. LXXXIII, Fig. 5. No complete objects were found, the most considerable being a portion of a sphinx (Pl. LXXXIII, Fig. 3).

GLASS.

Many small fragments, but no complete vessel. A detailed examination of all the glass is given by Mr. D. B. Harden in Chap. XI.

Specimens of the painted plaster are at the Chelmsford and Essex Museum.

CHAPTER XXII

THE STONE ENCLOSURE

By T. J. C. Baly

The site consisted of a square of rough stone walling with sides about 100m. long ; the inside of the enclosure had been thoroughly disturbed, presumably by *sabakhin*, and the walls had largely either fallen, or been pulled, down (Pl. CIII, Fig. 4), though that on the north-west was preserved to a height of about a metre, owing, apparently, to its being buried in sand (Pl. CIII, Figs. 3 and 5.). The four corners point roughly to the cardinal points. Along the insides of the NE, SE, and SW walls, were traces of bones, apparently human. These facts were ascertained during a preliminary survey, during which were also noted fragments of Roman pottery.

At the commencement of excavation a trial was made of the north-west wall and a section about 4m. long was exposed ; it was in good condition and measured 2·9m. broad by ·9m. high. Its construction was of the simplest, consisting of two lines of rough *dabsha*[1] laid to form the faces with further *dabsha* piled roughly into the intervening space (Pl. CIII, Fig. 6). At the same time, certain places where bones were visible were cleared and a disturbed tomb was discovered ; it lay against the inside face of the NE wall and the head had pointed west, though at the time of discovery only the legs were left. Later another grave was found against the inside of the same wall. (Tombs 6 and 5.) Other pits against the NE and SE walls were investigated, but though they were clearly tombs from the human remains found in them, they were too badly disturbed for accurate observations of them to be possible. A feature noted as common to them all was that in every case the wall had fallen on to, or been pulled over, the grave.

From these facts further excavation was decided upon and systematic clearance of the NW wall was commenced. It was found that the entire wall was preserved to a height of about a metre but that, unlike the other three walls, there were no graves against it. At the east corner of the enclosure was a pile of stones about 3m. square and ·8m. high, suggesting that it was a fall from the wall, which in that case would originally have been about 1·7m. in height ; further investigation showed that this was a possible height for the whole wall, since the men said that the enclosure had been a well-known local quarry for generations, all the nearby villages having drawn upon it. This fall was reserved for later investigation. Below the sand was a hard surface, which consisted of native rock with a thin layer of wind-blown material over it ; on this surface were found, against the NW wall, traces of charcoal, leather and donkey droppings. While clearing away loose stones, in order to see if the fall at the NE corner had a face, three fragments of polished red pottery, hard fabric, were found ; these were of a late, Romano-coptic type. In the wind-blown layer against the NW wall, inside, were found pieces of two pots of hard, green, fine fabric, while in the sand and on the surface level on both sides of the wall were found untypable fragments of the coarse wares of the Roman period.

[1] *dabsha*=boulder or any irregular lump of rock.

After the complete clearance of the NW wall the NE wall was next attacked. This provided graves on both the inside and outside. The wall itself was in much worse condition than the NW, in some places the faces being invisible, particularly on the inside. A complete list of the graves found in the enclosure is appended, but attention may here be drawn to the following from this wall. (*a*) Tomb 1 : Child ; traces of iron by left wrist. (*b*) Tomb 2 : Man ; semi-contracted, back slightly-curved ; iron in sand above right forearm. The grave was on the original surface, a rough square surrounded by large stones (Pl. CIV, Fig. 1.). (*c*) Tomb 4 : Male. Large split in skull and other traces of cuts. (*d*) Three pits containing fragments of fish. These pits, one circular and the other two oval, lay against the outside of the wall ; the depths were respectively 1·2m., 1·45m., and ·9m. Pit I contained fragments of cloth and traces of dates, while pit II had traces of what were apparently human remains above the fish layer ; this pit also had some of the fish in the bottom of a pot, the fragment being too small to be typable. The only feasible explanation of these pits seems to be that they were for preserving the fish away from the air, and that the fish found in them was that which was left uneaten.

The SE wall had practically no face preserved on its inner side, but the sand had preserved the line of the outer face almost intact, though only the bottom layer of facing-stones remained. Graves were found only on the inside, and of them the following may be noted : (*a*) Tomb 11. Child. Skull apparently damaged anciently. (*b*) Tomb 12. Man. Head covered with sherds.

The SW wall was the most interesting, since of the three walls against which graves were found, it was the least disturbed by quarriers. Clearance of the sand from its faces revealed nine piles of large stones against its inner face, looking almost like buttresses, besides the big falls at each corner. Under each of the piles was a grave, while of the two falls the northern covered four graves and the southern five. About six and a half metres from the southern corner was a grave against the outer face, also covered with a pile of stones. There is a gap in the wall 5m. broad at a distance of 37·6m. from the southern corner ; this was presumably the entrance, as the ends appear to be roughly faced, which would indicate that this is not merely a gap caused by quarriers.

The following tombs are noteworthy : (*a*) Tomb 15. Child. Silver ear-ring. (*b*) Tomb 16. Female. (*c*) Tomb 20. Man. Bead in filling beside feet ; blue glaze semi-cylinder. (*d*) Tomb 22. Man. In skull a hole and a dent 2·4cms. apart and each 1cm. in diameter. (Pl. CIV, Fig. 6). (*e*) Tomb 23. Child. (*f*) Tomb 26. Female. (*g*) Tomb 28. Child. Small ring beads, red, yellow and white at left wrist, and three ' scarab ' beads, one multi-coloured glazed bead, and a metal ring at the neck. (Pl. CIV, Fig. 5.)

In clearing such surface as had been left untouched by the *sabakhin*, a certain number of fragments of coarse Roman ware, decorated ware (Romano-coptic), Roman and Arab glaze, and glass of indeterminate date were found, together with a few beads of blue glaze. Also in the centre of the camp was a three-winged arrow-head. (Pl. CIV, Fig. 5.)

In assessing the evidence for the use of the enclosure, it is worthy of note that the Nag' Ḥammâdi road runs along the SW wall, that in which is the gate. (See aerial survey, Pl. CIII, Fig. 1.)

After much canvassing of various suggestions, it has been felt better to withhold any interpretation of this enclosure and to leave the facts as they stand. All suggestions seem to break down on one fact or another.

Two general notes may, however, be made. Firstly, on the question of the graves it may be

suggested that the wall was deliberately pulled over them, as there was neither any grave without a pile of stones, nor any pile of stones without a grave under it. Possibly this was a protection against jackals. Secondly, the presence of fairly good quality Arab glaze is hardly to be explained by the use of the place by *sabakhin* or quarriers, and rather suggests that it was occasionally used as a resting place on the Nag' Ḥammâdi road.

Pl. CIII, Fig. 2, shows one of the rough stone walls of Roman date running up into the foothills above the enclosure. In the same figure will be seen a further section of the Nag' Ḥammâdi road and some of the crescentic sand dunes.

THE GRAVES.

1. Child. Sup. ex. h/p.[1] Head N W. Against N E wall. Iron by left wrist.
2. Man. Semi-contracted ; on L. side. Head S E. Against N E wall. Square pit at gebel level. Iron in sand above forearm. (Pl. CIV, Fig. 1.)
3. Man. Sup. ex. h/p. Head N W. Against N E wall.
4. Man. Sup. ex. h/p. Head N W. Against N W wall. Large split in skull and various subsidiary cuts. Stones at S E end and on E side as far as elbow.
5. Man. Sup. ex. h/p. Head N W. Against N E wall. (Pl. CIV, Fig. 3.)
6. Legs only, in extended position. Head (had been) N W. Against N E wall.
7. Man. Sup. ex. h/p. Head N W. Against N E wall.
8. Man. Sup. ex. h/p. Head N W. Against N E wall.
9. Oblong pit outlined in stones parallel to N E wall. Bones visible.
10. Traces of head only. Pointing N E. Against S E wall.
11. Child. Sup. ex. h/p. Head N E. By S E wall. Head damaged, apparently anciently.
12. Man. Sup. ex. h/p. Head N E. Against S E wall. Sherds over the head. (Pl. CIV, Fig. 4.)
13. Man. Sup. ex. h/p. Head S W. Against S E wall.
14. Man. Sup. ex., legs and arms slightly flexed. Head W. Diagonal to S corner.
15. Man. Sup. ex. h/p. Head S W. Parallel to S E wall. Ear-ring found in sieving.
16. Man. Sup. ex. h/p. Head N W. Against S W wall. Stones at sides of head and feet and one beside the right hip. (Pl. CIV, Fig. 2.)
17. Woman. Sup. ex., hands beside pelvis. Head N W. Against S W wall.
18. Man. Sup. ex. h/p. Head N W. Against S W wall.
19. Man. Sup. ex. h/p. Head N W. Against S W wall.
20. Man. Sup. ex. h/p. Head S E. Against S W wall. Bead found in filling. Blue glaze, 1. C 2 b.
21. Man. Sup. ex. h/p. Head N W. Against S W wall.
22. Man. Sup. ex. h/p. Head N W. Against S W wall. A hole and a dent in the skull. 2·4cms. apart and each 1cm. in diameter.
23. Child. Sup. ex. h/p. Head S E. Against S W wall.
24. Man. Sup. ex. h/p. Head N W. Against S W wall.
25. Robbed tomb against S W wall.

[1] Sup. ex. h/p.=supine ; extended ; hands on pelvis.

26. Woman. Sup. ex., hands beside pelvis. Head S E. Against S W wall.
27. Man. Sup. ex., hands beside pelvis. Head W N W.
28. Child. Sup. ex. h/p. Head N W. Parallel to S W wall. Small ring-beads, blue, yellow, white and black, 1. B. 1. b, 1. B. 2. b, at left wrist. Glazed " scarab-" beads ; stratified flush eye-bead, XLVI, A.7.a—b, blue, white and green ; and metal ring at the neck.
29. Man. Sup. ex. h/p. Head N W. Against S W wall.
30. Man. Sup. ex. h/p. Head N E. Parallel to S E wall.
31. Disturbed grave ; feet only in position. Head to S W. Against S E wall.
32. Man. Sup. ex. h/p. Head N W. Against S W wall.

ABBREVIATIONS

(*The majority of these abbreviations are to be found only in Vol. III. The abbreviations used for volumes of papyri and ostraka are those generally accepted, see* Cambridge Ancient History, *Vol. X.*)

A	adobe
Æ	bronze
Aeg. Rel.	*A handbook of Egyptian Religion*, Adolf Erman, trans. A. S. Griffith, London, 1907
Apis Papyrus, The	see p. 18, n. 1
Æ	silver
Ar.	Armant
Ar. S	southern part of E.E.S. concession
Ar. X	from the E.E.S. concession, without specific provenance
Æ	gold
A.Z.	*Zeitschrift für ägyptische Sprache und Altertumskunde*, Leipzig, 1863 ff.
B	burnt brick
b	breadth
Baq.	Baqaria
Baq. R.	Roman Village
Baq. X	without specific associations
Be.	blue
Bf.	buff
Bk.	black
B.M.	British Museum, London
Bn.	brown
Bolton	Chadwick Museum, Bolton, Lancs.
Brit. Mus.	British Museum, London
Brussels	Fondation Reine Elisabeth, Musées Royaux du Cinquentenaire, Bruxelles
Buch.	Bucheum
Buch. X	without specific associations
c	circa
Cairo	National Museum, Cairo
Ce.	coarse
Chelmsford	Chelmsford and Essex Museum, Chelmsford
Cleveland	Cleveland Museum of Arts, Cleveland, Ohio
Copenhagen	National Museum, Copenhagen
CopenhagenN.G.	Ny Carlsberg Glyptotek, Copenhagen
C.S. of A.C.	Central School of Arts and Crafts, Southampton Row, London
D	dark
d	depth
△	drawing (except on pp. 49 and 104)
Dec.	decoration or decorated
E	East
E.E.S.	Egypt Exploration Society
F	fine
ϕ	photograph
Gn.	green
Gs.	glass
Gy.	grey
H	hard
h	height
J.E.A.	*Journal of Egyptian Archæology*, London, 1914 ff.
L	Light, or length, according to context
Le Sérapeum de Memphis	see p. 2, n. 3.
Louvre	Musée du Louvre, Paris
Lste.	limestone
M	medium
Manchester	Manchester Museum, The University, Manchester
Munich	Münchener ägyptische Sammlung
N	North
Obsdn.	obsidian
Oe.	orange
OL	overall length
P	passage
Pe.	purple
Pk.	pink
Pol.	polished
Rec. de Trav.	*Receuil de Travaux relatifs à la philologie et à l'archéologie égyptiennes et assyriennes*, Paris, 1870–1923.
Restn.	restoration
S	soft, or South, according to context
Sérapeum de Memphis, Le	see p. 2, n. 3
Strasbourg	Institut Egyptologique, Université de Strasbourg
Sup. ex h/p.	supine, extended, hands over pelvis
T	text
T.C.	terracotta
Tem.	temenos
The Apis Papyrus	see p. 18, n. 1
Toronto	Royal Ontario Museum of Archæology, Toronto
U.C.L.	Edwards Library, University College, Gower Street, London
V	very
Vienna	Kunsthistorisches Museum, ägyptisch-oriental Sammlung, Wien.
W	width, or West, according to context
Weights and Measures	*Ancient Weights and Measures*, Petrie, London, 1926
W.H.M.M.	Wellcome Historical Medical Museum, Euston Rd., London
We.	white
X	without specific provenance
x 2 (etc.)	two (etc.) examples
Yw.	yellow
200 A.V.	Arab remains in the 200 cemetery
200 R.V.	Roman remains in the same place

INDEX

CORRECTIONS AND ADDITIONS

Historical Summary. On p. 17, fourth line from bottom and note 2. While this book was in the press, we obtained a copy of G. Zoega, *De Origine et Usu Obeliscorum*, and we find that not only is Mariette's quotation inaccurate, but he has added the end of one sentence to the beginning of another. The text contains no reference to four bulls or gods, but reads: "(They come into existence at his utterance (?) every day (for) his strength extends to the whole circuit of this land on) its four sides. Bulls and their cows (are united in joy and increase their progeny for him)," the portions in brackets being those not quoted by Mariette. See also A. Erman, *Römische Obelisken*, p. 31 (*Abh. d. Kgl. Preuss. Akad. d. Wiss.*, 1917. *Phil.-Hist. Klasse. Nr.* 4).

Amulets. On p. 127, sixteen lines from bottom, in the fifth column. "Hieroglyph: for inlay"; the hieroglyph referred to is V. 6 or 7 in A. Gardiner, *Egyptian Grammar*, sign list.

Pottery, and *Baqaria Roman Village.* Whereas in the text sub-types of pottery are distinguished by small letters, 7a, 7b, 7c, etc.; in the corpus plates capitals have been used for greater legibility, 7 A, B, C, etc. Both sets of symbols refer to the same forms.